Project Evaluation

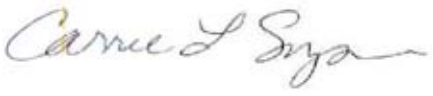
Project Log # 200706083

Preliminary Evaluation of 14 Roundabout Installations

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator



_____ 9/18/2007_____

Carrie L. Simpson, PE Date

Traffic Safety Project Engineer

PROJECT INFORMATION AND BACKGROUND

A statewide listing of roundabout installation locations was obtained from the Congestion Management Section. Note that this was not necessarily an all-inclusive listing but contained all known locations at the time. It contained 37 roundabout locations, which were built between 1999 through 2006. Three of the locations were under private jurisdiction and were removed from the list because we could not obtain crash data. The remaining 34 roundabout locations are listed below in Table 1.

Seventeen locations contained enough after period data to perform a preliminary countermeasure evaluation. Note that three of these locations could not be evaluated (see *italicized* locations) because either the intersection did not exist prior to the roundabout installation or one of the legs was removed in the after period. The remaining 14 roundabout locations with greater than 3 years of after period crash data have been evaluated to provide preliminary results. All roundabout locations with less than three years of after period crash data will be evaluated in the future *Final Report* when enough after period data becomes available.

TABLE 1. STATEWIDE LISTING OF ROUNDABOUT LOCATIONS

Locations For Preliminary Evaluation: Greater Than Three Years of After Period Crash Data Available

Built	Div	County	Municipality	Location	Jurisdiction	Description
1999	9	Forsyth	Clemmons	Fraternity Church at Hope Church	State	New School Drive
2000	5	Durham	Durham	Washington at Glendale	Muni	Modified Circle, Part of I-85 Detour Route
2000	9	Forsyth	Lewisville	Williams at US 421 SB Ramps	State	Solved Capacity Problem
2000	10	Mecklenburg	Charlotte	Ninth at Davidson	Muni	
2001	*2*	*Craven*	*New Bern*	*Broad at E. Front **	*State*	*Part of Enhancement Project*
2001	9	Forsyth	Winston-Salem	Westview at Buckingham	Muni	City - Possible Traffic Calming Location
2002	9	Davie	Advance	NC 801 at I-40 EB Ramp	State	Developer - "Temporary" Intersection Fix
2002	*9*	*Forsyth*	*Bethania*	*Turfwood at Long Creek **	*State*	*Developer*
2002	9	Forsyth	Lewisville	Styers Ferry at Utility	State	
2002	11	Wilkes		Yellowbanks at Haymeadow	State	Spot Safety
2002	13	Buncombe	Asheville	Lake at Mountain	State	Developer
2002	13	Buncombe	Asheville	WT Weaver at University Heights	State	City / University Project
2003	*1*	*Dare*	*Kill Devil Hills*	*Veterans at Sixth **	*Muni*	*Built For New High School Drive*
2003	5	Durham	Durham	NC 751 at Old Erwin	State	Spot Safety
2003	5	Wake	Raleigh	Pullen at Stinson	Muni	
2003	9	Forsyth	Lewisville	Williams at US 421 NB Ramps	State	"Mirror" Image Of Other Ramp
2003	10	Mecklenburg	Charlotte	Park at Tremont	Muni	City - Possible Traffic Calming Location

Future Locations to Be Evaluated: Less Than Three Years of After Period Crash Data Available

Built	Div	County	Municipality	Location	Jurisdiction	Description
2004	10	Mecklenburg	Charlotte	Shopton Road	State	Developer
2004	10	Mecklenburg	Huntersville	Stumptown Road	State	Developer
2004	14	Haywood	Waynesville	US 23B	State	TIP Project
2004	14	Polk	Columbus	I-26 SB Ramp at NC 108	State	Interchange - Two Lane Bridge

Future Locations to Be Evaluated: Less Than Two Years of After Period Crash Data Available

Built	Div	County	Municipality	Location	Jurisdiction	Description
2005	5	Durham	Durham	Woodcroft at Highgate	Muni	City Safety Project, In Lieu Of Signal
2005	5	Durham	Chapel Hill	Ephesus Church at Pope	State	Developer Design / Build, Has Geometric Issues
2005	8	Moore	Southern Pines	Knoll Road	State	
2005	9	Forsyth	Winston-Salem	Old Salem/ Main at Salem	State	TIP Project U-2926 - Multilane
2005	10	Mecklenburg	Charlotte	Moores Chapel at I-485 NB Ramp	State	Roundabout Interchange - I-485 Not Open Yet
2005	10	Mecklenburg	Charlotte	Moores Chapel at I-485 SB Ramp	State	Roundabout Interchange - I-485 Not Open Yet
2005	12	Gaston	Gastonia	Gaston Day School Road	State	Safety Problem - Did Not Meet Signal Warrants
2005	13	Buncombe	Asheville	College at Oak	Muni	Downtown Redevelopment - Road "Diet"

Future Locations to Be Evaluated: Less Than One Year of After Period Crash Data Available

Built	Div	County	Municipality	Location	Jurisdiction	Description
2006	5	Wake	Wake Forest	NC 98 at US 1A	State	Moving Ahead Project
2006	10	Mecklenburg	Davidson	Griffith at Davidson Gateway	State	Developer - Multilane Existing Intersection
2006	10	Mecklenburg	Davidson	Griffith at Jetton	State	Developer - Multilane Existing Intersection
2006	10	Stanly	Norwood	Cottonville at South Stanly School	State	
2006	14	Polk	Columbus	I-26 NB Ramp at NC 108	State	Interchange - Two Lane Bridge

**Could not evaluate due to the addition (or removal) of an intersection leg in the after period.*

LOCATIONS FOR PRELIMINARY EVALUATION

The 14 roundabout locations with greater than 3 years of after period were divided into 3 groups by intersection characteristics. Group 1 consists of the roundabout locations with a mainline speed limit at or below 35 mph, and stop sign control in the before period. Group 2 consists of the roundabout locations with a mainline speed limit above 35 mph, and stop sign control in the before period. Group 3 (which contains only one location) consists of the roundabout locations with a mainline speed limit at or below 35 mph, and signalized control in the before period.

The roundabout locations contain a mix of rural and urban environments. A majority of sites have four intersection legs, although several have three intersection legs. Because field reviews were not performed prior to the preliminary evaluation, the speed limits were based on the TEAAS ordinance system where available. Where unavailable, crash reports were used to obtain the intersection approach speed limits. Field reviews will be performed prior to the final evaluation to confirm data.

Please see the *Appendices* for a location map and site photos obtained from the Congestion Management Section.

TABLE 2. LISTING OF ROUNDABOUT LOCATIONS FOR PRELIMINARY EVALUATION

Group 1. Mainline Speed Limit At or Below 35 mph (Prior Control - Stop Sign)

Div	County	Municipality	Location	Built	Prior Control	Setting	# Legs	Speed Limit	
								Major Rd	Minor Rd
5	Wake	Raleigh	Pullen at Stinson	2003	Stop	Urban	4	25	25
10	Mecklenburg	Charlotte	Park at Tremont	2003	Stop	Urban	4	25	25
5	Durham	Durham	Washington at Glendale	2000	Stop	Urban	4	35	35
9	Forsyth	Winston-Salem	Westview at Buckingham	2001	Stop	Urban	4	35	35
13	Buncombe	Asheville	WT Weaver at University Heights	2002	Stop	Urban	3	35	35
9	Davie	Advance	NC 801 at I-40 EB Ramp	2002	Stop	Rural	4	35*	70 (Ramp)
13	Buncombe	Asheville	Lake at Mountain	2002	Stop	Rural	3	35	35

Group 2. Mainline Speed Limit Above 35 mph (Prior Control - Stop Sign)

Div	County	Municipality	Location	Built	Prior Control	Setting	# Legs	Speed Limit	
								Major Rd	Minor Rd
9	Forsyth	Lewisville	Styers Ferry at Utility	2002	Stop	Rural	4	45	45
9	Forsyth	Lewisville	Williams at US 421 SB Ramps	2000	Stop	Rural	4	45*	50*/ 65 (Ramp)
9	Forsyth	Lewisville	Williams at US 421 NB Ramps	2003	Stop	Rural	4	45*	65 (Ramp)
5	Durham	Durham	NC 751 at Old Erwin	2003	Stop	Rural	3	55	45
9	Forsyth	Clemmons	Fraternity Church at Hope Church	1999	Stop	Rural	4	55	55
11	Wilkes	N/A	Yellowbanks at Haymeadow	2002	Stop	Rural	4	55	55

Group 3. Mainline Speed Limit At or Below 35 mph (Prior Control - Signal)

Div	County	Municipality	Location	Built	Prior Control	Setting	# Legs	Speed Limit	
								Major Rd	Minor Rd
10	Mecklenburg	Charlotte	Ninth at Davidson	2000	Signal	Urban	4	35	35

** Speed limits based on TEAAS ordinances.*

RESULTS

The following tables provide location and crash information for each of the treatment sites. Tables 3, 6, and 9 provide a listing of before and after crash data at each site. The treatment data consisted of all crashes within 150 feet of the treatment intersections. Please see the *Appendices* for the before and after collision diagrams provided at each location.

The analysis periods for the treatment sites were between 3.17 years and 7.17 years. Because the installation dates varied from 1999 through 2003, the time periods for each location varied depending on when the roundabout was constructed. The ending dates for the analyses were determined by the available crash data at the time the crash analysis was completed. Due to limited knowledge of the installation dates, the entire year of installation was omitted from this analysis to provide an adequate construction period. Note that the before and after time periods consisted of an equal number of years at each location.

Tables 4 and 7 provide the aggregated naïve before and after analysis for Groups 1 and 2, respectively. Note that the value after the "+/-" notation in this evaluation indicates the standard deviation of an estimated value.

Tables 5 and 8 provide the aggregated before and after analysis with an adjustment for traffic volumes for Groups 1 and 2, respectively. This adjustment was provided to consider the effects of an increase in volume, which the naïve before and after analysis does not take into account. A linear assumption was made to account for the increase in traffic volumes.

Group 1. Mainline Speed Limit At or Below 35 mph (Prior Control - Stop Sign)

TABLE 3. GROUP 1 CRASH DATA

						Before		After		Percent Increase (+)/
Div	County	Municipality	Location	Built	Years	AADT	Total Crashes	AADT	Total Crashes	Percent Decrease (-)
5	Wake	Raleigh	Pullen at Stinson	2003	3.17	11000	12	12500	3	-75.0%
10	Mecklenburg	Charlotte	Park at Tremont	2003	3.17	7200	4	6000	4	0.0%
5	Durham	Durham	Washington at Glendale	2000	6.17	5500	4	5500	5	25.0%
9	Forsyth	Winston-Salem	Westview at Buckingham	2001	5.17	7400	6	6000	0	-100.0%
13	Buncombe	Asheville	WT Weaver at University Heights	2002	4.17	3000	10	3800	3	-70.0%
9	Davie	Advance	NC 801 at I-40 EB Ramp	2002	4.17	9000	12	16800	13	8.3%
13	Buncombe	Asheville	Lake at Mountain	2002	4.17	2000	0	2400	1	N/A

TABLE 4. GROUP 1 NAÏVE BEFORE AND AFTER ANALYSIS	Estimates of Parameters
Actual Number of After Period Crashes, λ	29 +/- 5
Predicted Number of After Period Crashes, π	48 +/- 7
Index of Effectiveness, θ	0.59 +/- 0.14
Percent Increase (+)/ Percent Decrease (-)	**-41% +/- 14%**

TABLE 5. GROUP 1 BEFORE AND AFTER ANALYSIS WITH TRAFFIC ADJUSTMENT	Estimates of Parameters
Actual Number of After Period Crashes, λ	29 +/- 5
Predicted Number of After Period Crashes, π	61 +/- 10
Index of Effectiveness, θ	0.46 +/- 0.11
Percent Increase (+)/ Percent Decrease (-)	**-54% +/- 11%**

For Group 1 Locations, the results of the naïve before and after analysis yield a 41% (+/- 14%) reduction in total crashes. Also, the results of the before and after analysis with consideration for traffic increase yielded a 54% (+/- 11%) reduction in total crashes.

Group 2. Mainline Speed Limit Above 35 mph (Prior Control - Stop Sign)

TABLE 6. GROUP 2 CRASH DATA

						Before		After		Percent Increase (+)/
Div	**County**	**Municipality**	**Location**	**Built**	**Years**	**AADT**	**Total Crashes**	**AADT**	**Total Crashes**	**Percent Decrease (-)**
9	Forsyth	Lewisville	Styers Ferry at Utility	2002	4.17	4500	2	5000	2	0.0%
9	Forsyth	Lewisville	Williams at US 421 SB Ramps	2000	6.17	12900	11	14200	3	-72.7%
9	Forsyth	Lewisville	Williams at US 421 NB Ramps	2003	3.17	12500	4	13600	6	50.0%
5	Durham	Durham	NC 751 at Old Erwin	2003	3.17	16100	14	15600	2	-85.7%
9	Forsyth	Clemmons	Fraternity Church at Hope Church	1999	7.17	2200	0	4400	2	N/A
11	Wilkes		Yellowbanks at Haymeadow	2002	4.17	3600	4	2900	4	0.0%

TABLE 7. GROUP 2 NAÏVE BEFORE AND AFTER ANALYSIS	**Estimates of Parameters**
Actual Number of After Period Crashes, λ	19 +/- 4
Predicted Number of After Period Crashes, π	35 +/- 6
Index of Effectiveness, θ	0.53 +/- 0.15
Percent Increase (+)/ Percent Decrease (-)	**-47% +/- 15%**

TABLE 8. GROUP2 BEFORE AND AFTER ANALYSIS WITH TRAFFIC ADJUSTMENT	**Estimates of Parameters**
Actual Number of After Period Crashes, λ	19 +/- 4
Predicted Number of After Period Crashes, π	36 +/- 6
Index of Effectiveness, θ	0.52 +/- 0.15
Percent Increase (+)/ Percent Decrease (-)	**-48% +/- 15%**

For Group 2 Locations, the results of the naïve before and after analysis yield a 47% (+/- 15%) reduction in total crashes. Also, the results of the before and after analysis with consideration for traffic increase yielded a 48% (+/- 15%) reduction in total crashes.

Group 3. Mainline Speed Limit At or Below 35 mph (Prior Control - Signal)

TABLE 9. GROUP 3 CRASH DATA

						Before		After		Percent Increase (+)/
Div	**County**	**Municipality**	**Location**	**Built**	**Years**	**AADT**	**Total Crashes**	**AADT**	**Total Crashes**	**Percent Decrease (-)**
10	Mecklenburg	Charlotte	Ninth at Davidson	2000	6.17	20500	31	19500	8	-74.2%

The single location in Group 3 experienced a 74% reduction in total crashes. Hopefully, in the *Final Report*, we will be able to utilize more locations with prior signalized control. Then we will be able to provide a more accurate estimate of the crash reductions for this group.

CONCLUSIONS

The preliminary evaluation of roundabout installations resulted in the following crash reduction factors:

Group 1. Mainline Speed Limit At or Below 35 mph (Prior Control – Stop Sign)
Total Crashes Using Naïve Before and After Analysis: **-41% +/- 14%**
Total Crashes Using Before and After Analysis With Traffic Adjustment: **-54% +/- 11%**

Group 2. Mainline Speed Limit Above 35 mph (Prior Control - Stop Sign)
Total Crashes Using Naïve Before and After Analysis: **-47% +/- 15%**
Total Crashes Using Before and After Analysis With Traffic Adjustment: **-48% +/- 15%**

Also, the single location in Group 3 (with Prior Control – Signal) experienced a 74% reduction in total crashes. The preliminary results demonstrate that all three groups of roundabout locations appear to have had a substantial reduction in the frequency of crashes from the before to the after period.

In addition to our preliminary study results, previous research has also shown that roundabouts may improve the safety of intersections. The crash reductions resulting from roundabout installations may be attributed to eliminating or altering conflict types, reducing speed differentials at intersections, and forcing drivers to decrease speeds as they proceed into and through the intersection. Roundabouts reduce vehicular crossing conflicts, thus diminishing the opportunity for Frontal Impact crashes to occur. The reduction of conflicts through the physical and geometric features of a roundabout have been shown to be more effective than the separation of conflicts by time as in a signalized intersection.

Please note that this is a preliminary evaluation based only on the current available data. This evaluation will be updated when there is at least three years of after data available at the remaining locations, so a more concrete conclusion can be drawn. At that time we will be able to provide more objective and definite information regarding actual crash reduction factors.

REFERENCES

1. Federal Highway Administration. Roundabouts: An Informational Guide. FHWA-RD-00-67, Washington, D.C., 2000.

2. Persaud, B.N., R.A. Retting, P.E. Garder, and D. Lord. Crash Reductions Following Installation of Roundabouts in the United States. Insurance Institute for Highway Safety, Arlington, VA, 2000.

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Please direct questions or comments on this evaluation to Carrie Simpson, PE at (919) 662-4607 or via email at clsimpson@dot.state.nc.us.

APPENDICES

A) Location Map

B) Location Photos and Collision Diagrams
- Group 1
- Group 2
- Group 3

Appendix A. Location Map

LOCATION MAP: Roundabout Locations for Preliminary Evaluation

- ***Group 1. Seven Locations with Mainline Speed Limit At or Below 35 mph (Prior Control - Stop Sign)***
- ***Group 2. Six Locations with Mainline Speed Limit Above 35 mph (Prior Control - Stop Sign)***
- ***Group 3. One Location with Mainline Speed Limit At or Below 35 mph (Prior Control - Signal)***

Appendix B. Location Photos and Collision Diagrams

GROUP 1

Pullen at Stinson

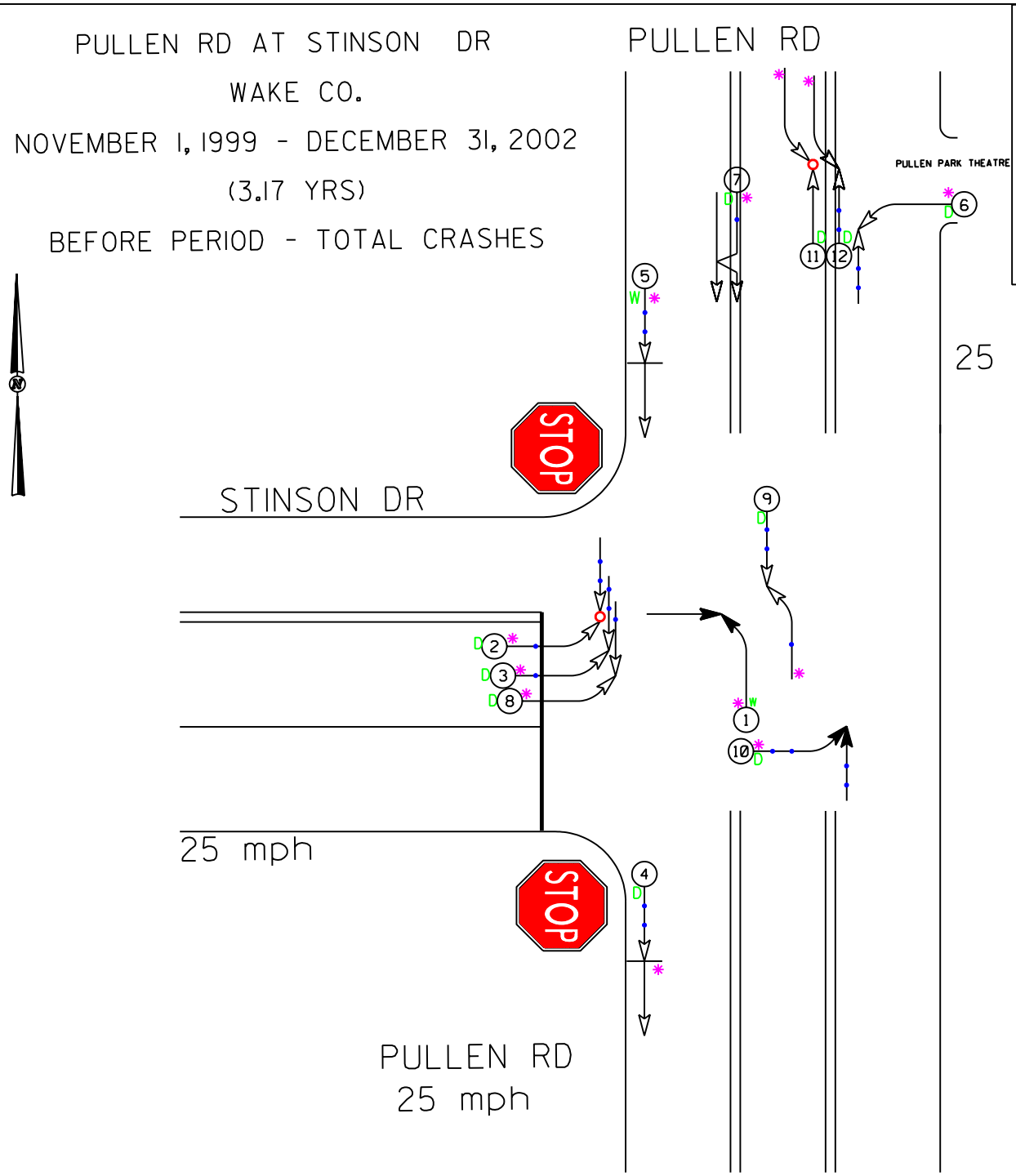
PULLEN RD AT STINSON DR

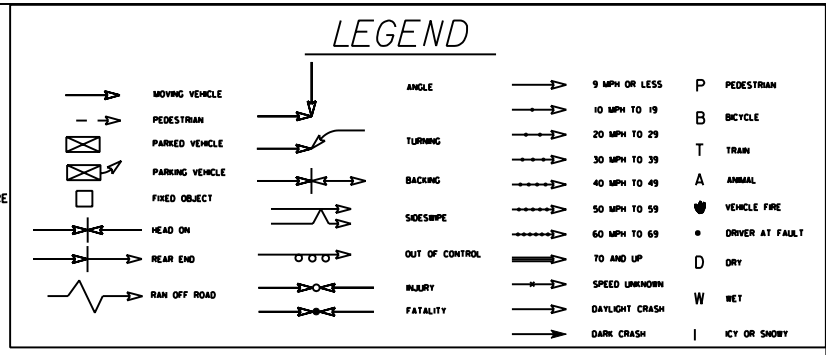
WAKE CO.

NOVEMBER 1, 1999 - DECEMBER 31, 2002

(3.17 YRS)

BEFORE PERIOD - TOTAL CRASHES





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SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF PULLEN RD
AT STINSON DR

COLLISION DIAGRAM

DIVISION: 5	REGION: CAPITAL
STUDY PERIOD: 11/01/99 - 12/31/02	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/13/2007
LOG NUMBER:	200706083
PAGE:	1OF 1

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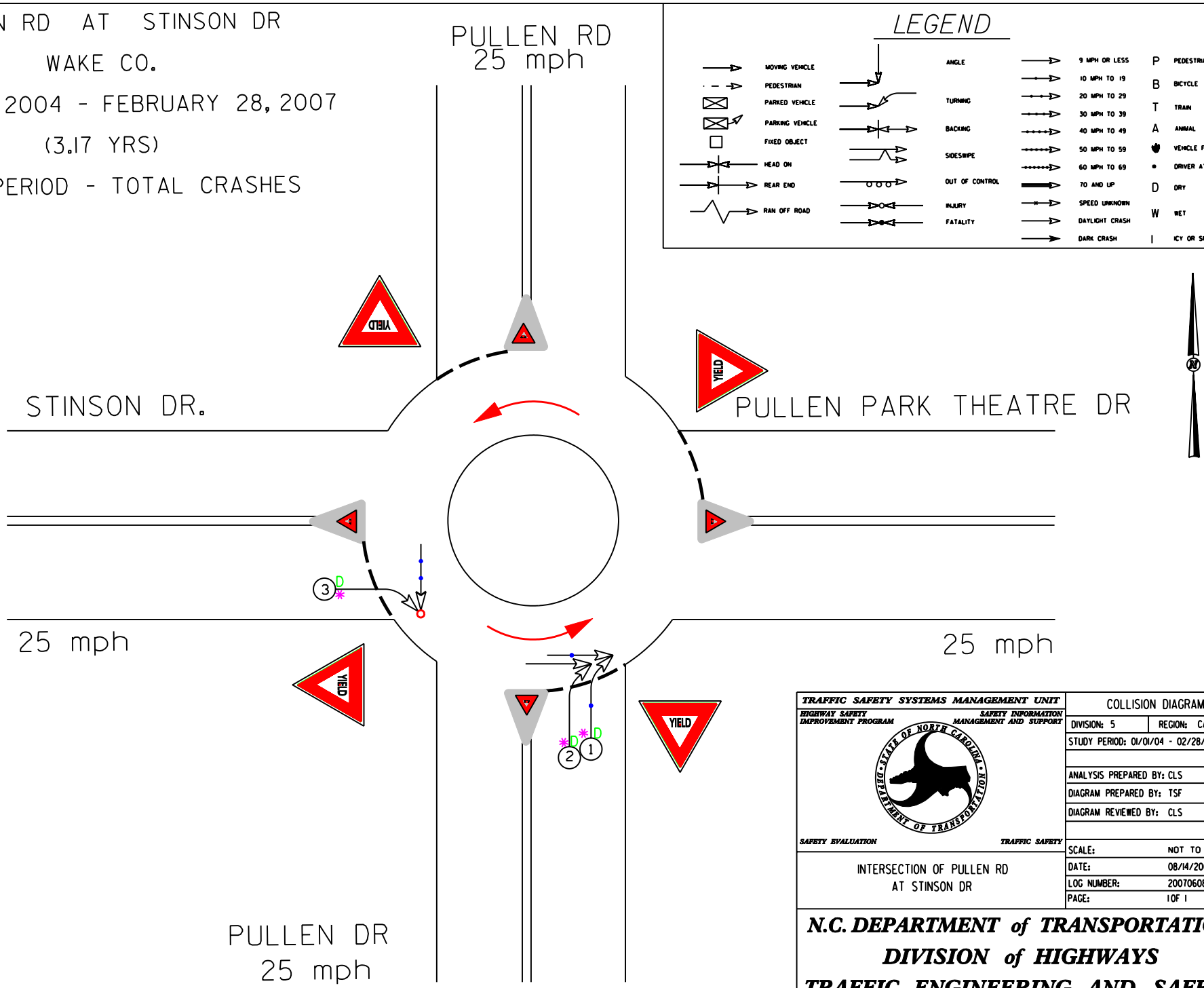
PULLEN RD AT STINSON DR

WAKE CO.

JANUARY 1, 2004 - FEBRUARY 28, 2007

(3.17 YRS)

AFTER PERIOD - TOTAL CRASHES



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INTERSECTION OF PULLEN RD AT STINSON DR

COLLISION DIAGRAM

DIVISION: 5	REGION: CAPITAL
STUDY PERIOD: 01/01/04 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/14/2007
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Park at Tremont

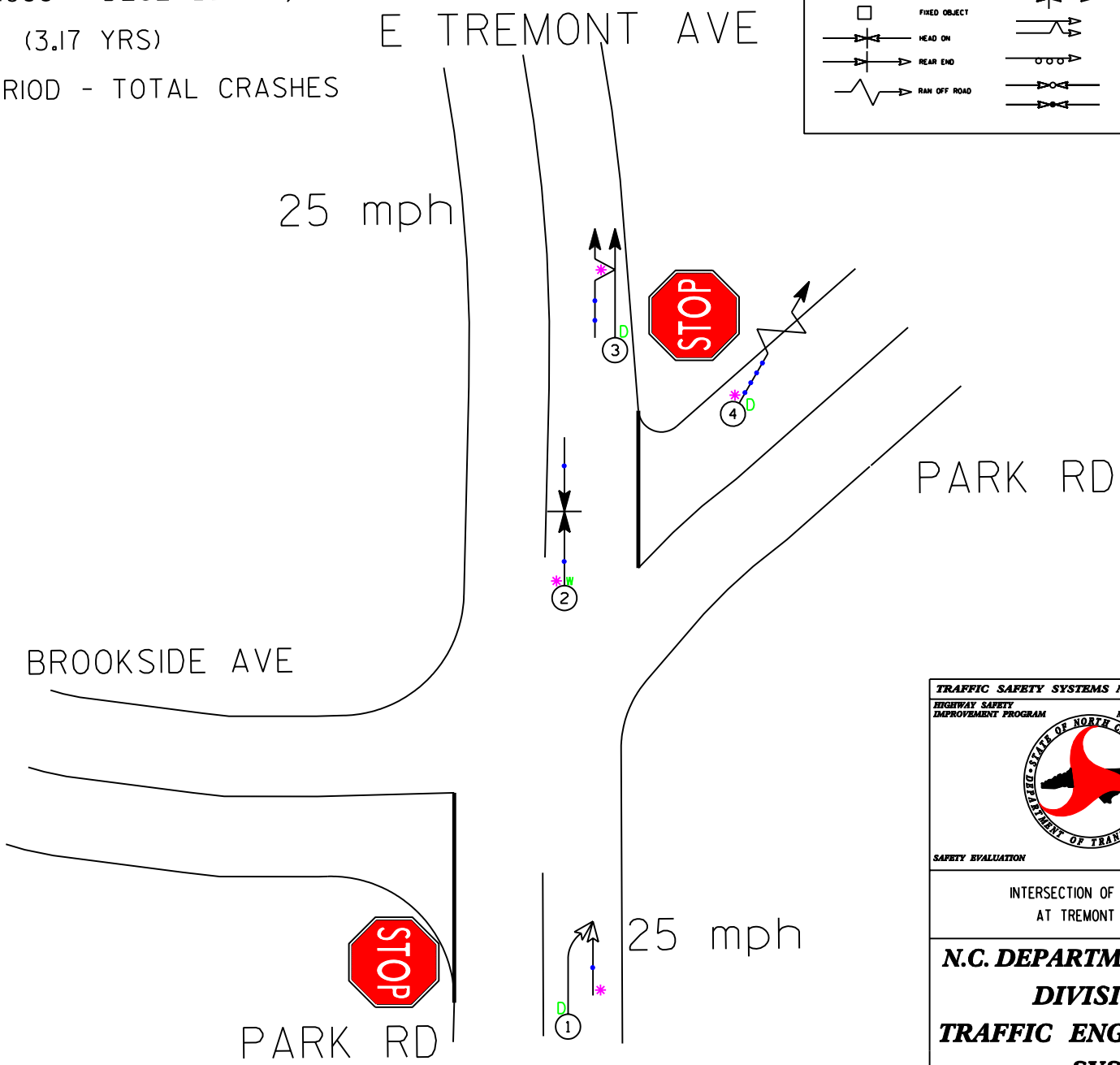
PARK RD AT TREMONT AVE

MECKLENBURG CO.

NOVEMBER 1, 1999 - DECEMBER 31, 2002

(3.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

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INTERSECTION OF PARK RD
AT TREMONT AVE

COLLISION DIAGRAM

DIVISION: 10	REGION: METRO
STUDY PERIOD: 11/01/99 - 12/31/02	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
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DATE:	08/13/2007
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PAGE:	1 OF 1

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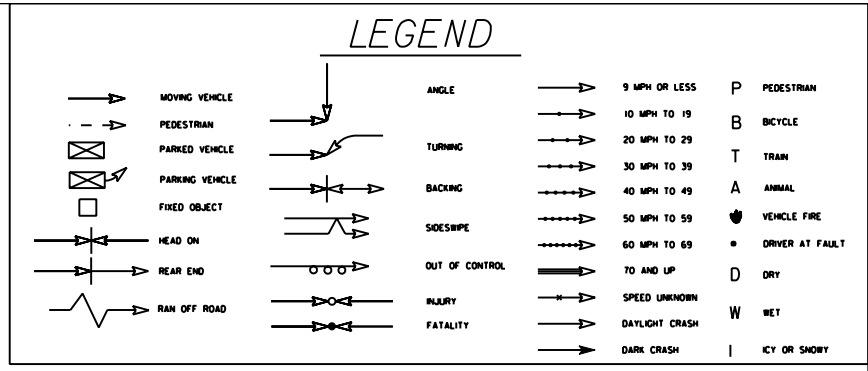
PARK RD AT TREMONT AVE

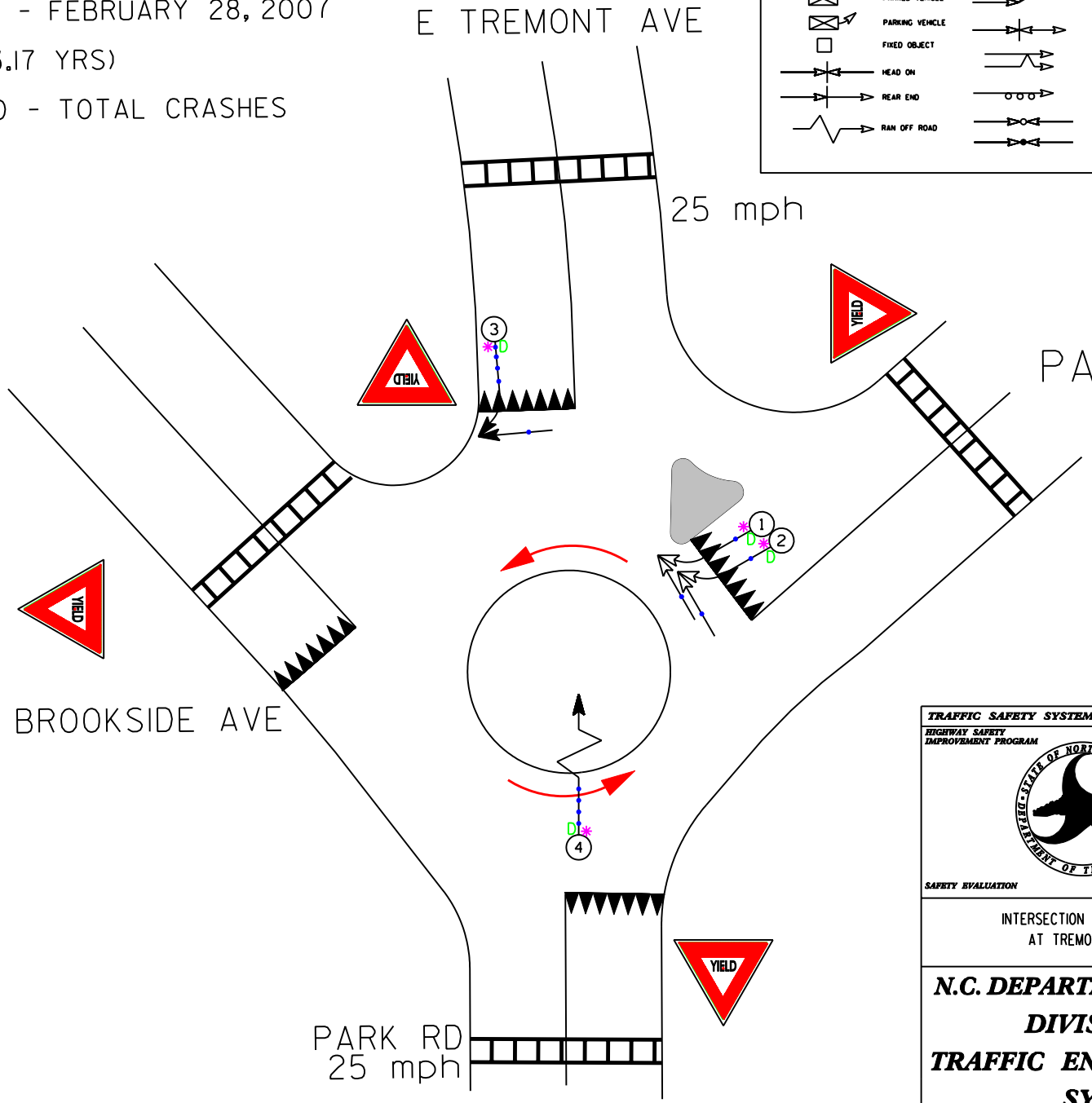
MECKLENBURG CO.

JANUARY 1, 2004 - FEBRUARY 28, 2007

(3.17 YRS)

AFTER PERIOD - TOTAL CRASHES





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HIGHWAY SAFETY IMPROVEMENT PROGRAM / SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: 10 / REGION: METRO
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	DIAGRAM PREPARED BY: TSF
SAFETY EVALUATION / TRAFFIC SAFETY	DIAGRAM REVIEWED BY: CLS
	SCALE: NOT TO SCALE
INTERSECTION OF PARK RD AT TREMONT AVE	DATE: 08/14/2007
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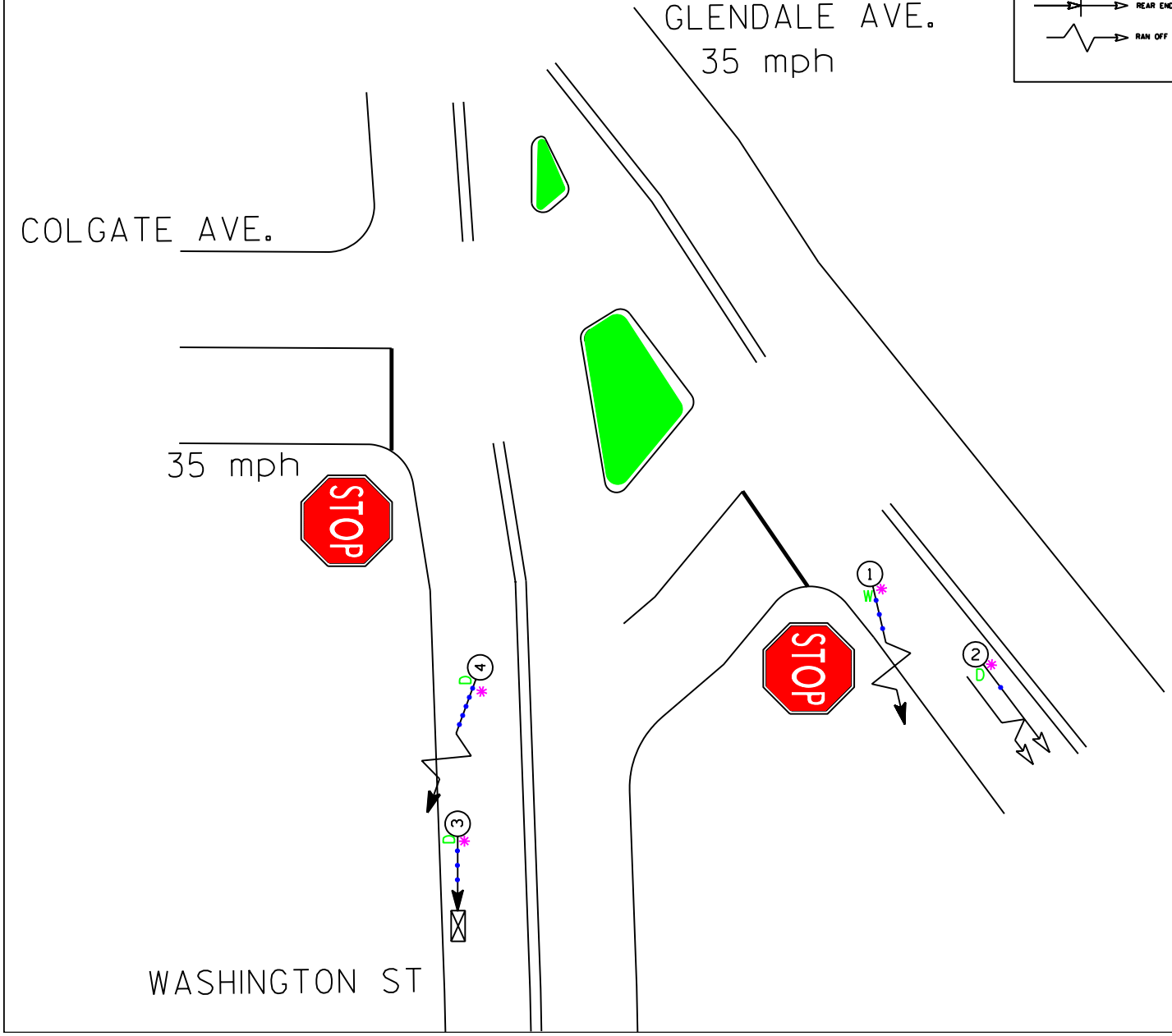
Washington at Glendale

GLENDALE AVE. AT WASHINGTON ST

DURHAM CO.

NOVEMBER 1, 1993 - DECEMBER 31, 1999
(6.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
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SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

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AT WASHINGTON ST

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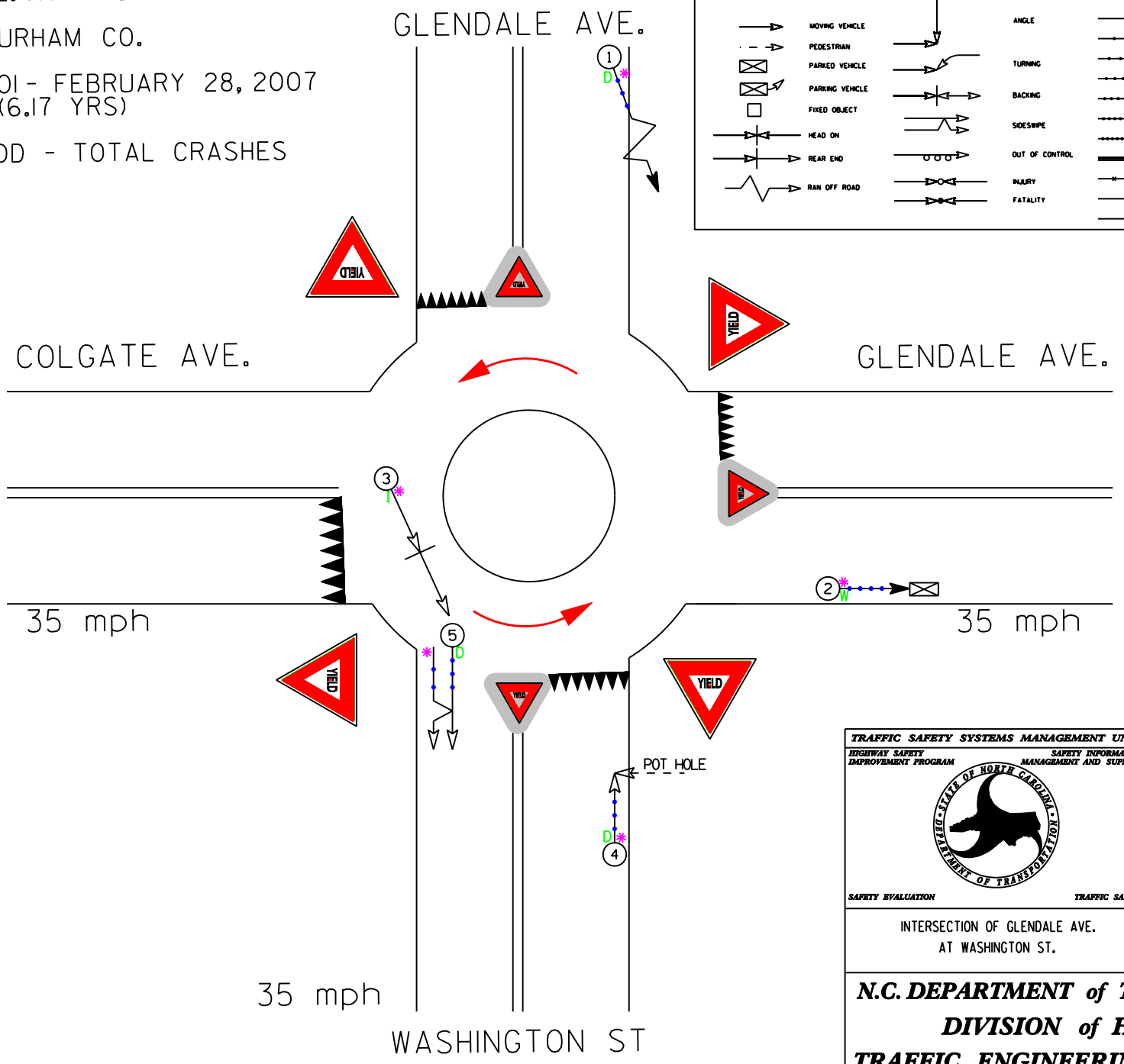
GLENDALE AVE. AT WASHINGTON ST

DURHAM CO.

JANUARY 1, 2001 - FEBRUARY 28, 2007
(6.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE	ANGLE	9 MPH OR LESS	P	PEDESTRIAN
PEDESTRIAN		10 MPH TO 19	B	BICYCLE
PARKED VEHICLE	TURNING	20 MPH TO 29	T	TRAIN
PARKING VEHICLE		30 MPH TO 39	A	ANIMAL
FIXED OBJECT	BACKING	40 MPH TO 49		VEHICLE FIRE
HEAD ON	SIDESWIPE	50 MPH TO 59		DRIVER AT FAULT
REAR END		60 MPH TO 69	D	DRY
RAN OFF ROAD	OUT OF CONTROL	70 AND UP	W	WET
	INJURY	SPEED UNKNOWN	I	ICY OR SNOWY
	FATALITY	DAYLIGHT CRASH		
		DARK CRASH		

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM | SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION | TRAFFIC SAFETY

INTERSECTION OF GLENDALE AVE.
AT WASHINGTON ST.

COLLISION DIAGRAM

DIVISION: 5	REGION: CAPITAL
STUDY PERIOD: 01/01/01 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/24/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

Westview at Buckingham

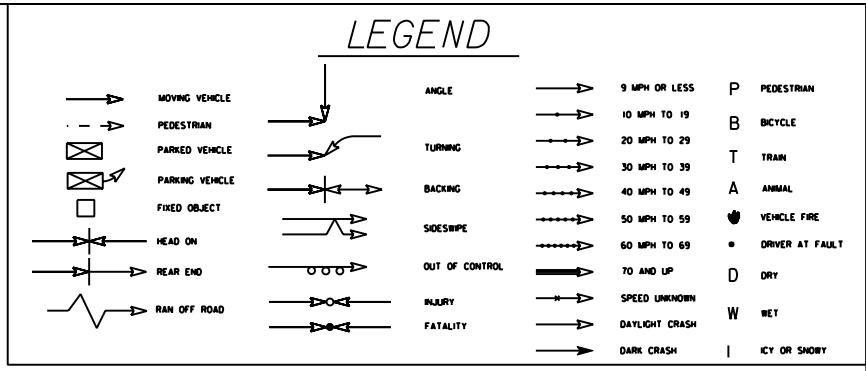
WESTVIEW DR AT BUCKINGHAM DR

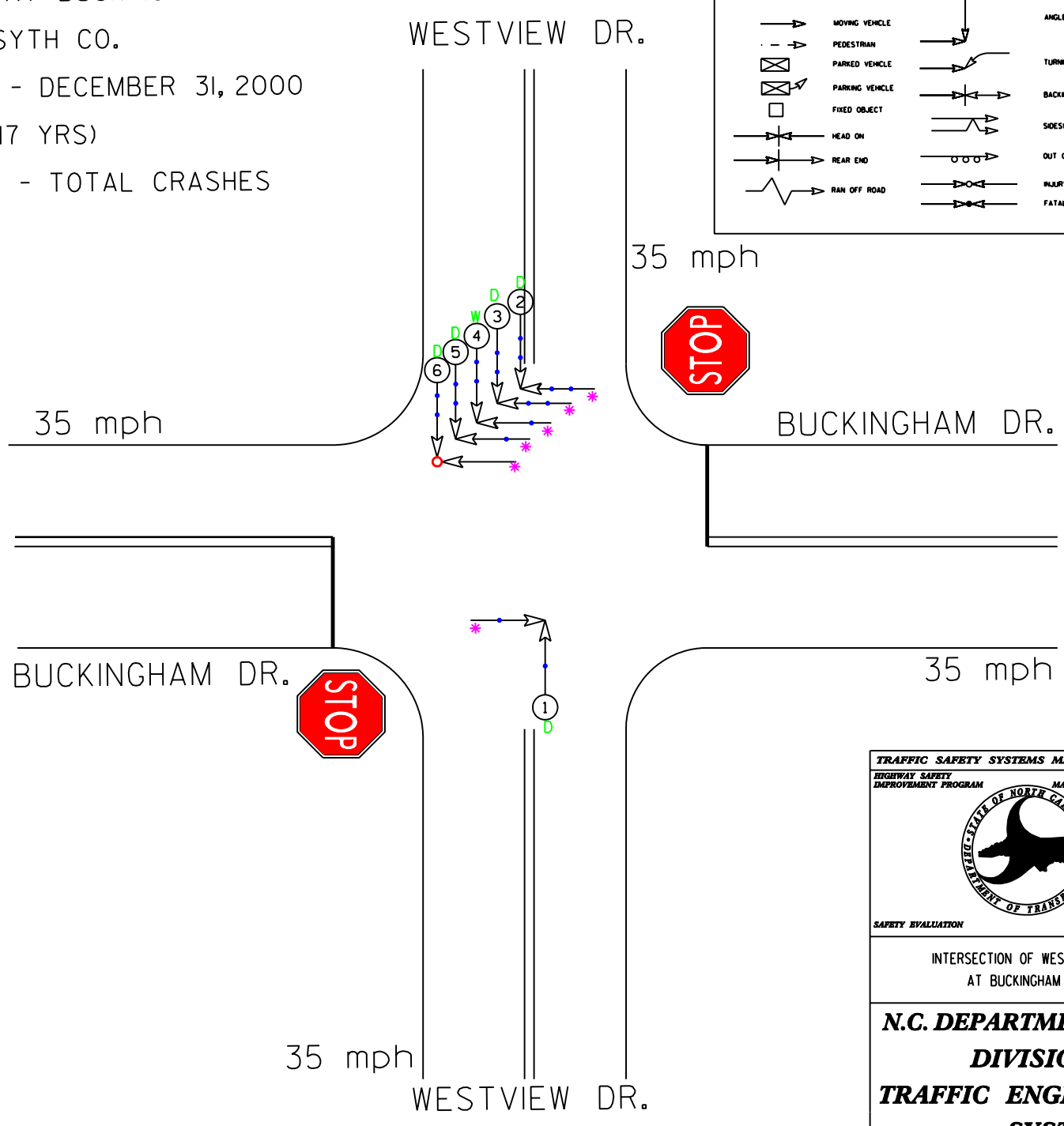
FORSYTH CO.

NOVEMBER 1, 1995 - DECEMBER 31, 2000

(5.17 YRS)

BEFORE PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT	COLLISION DIAGRAM
HIGHWAY SAFETY IMPROVEMENT PROGRAM / SAFETY INFORMATION MANAGEMENT AND SUPPORT	DIVISION: 9 REGION: TRIAD
	STUDY PERIOD: 11/01/95 - 12/31/00
	ANALYSIS PREPARED BY: CLS
	DIAGRAM PREPARED BY: TSF
SAFETY EVALUATION / TRAFFIC SAFETY	DIAGRAM REVIEWED BY: CLS
	SCALE: NOT TO SCALE
INTERSECTION OF WESTVIEW DR. AT BUCKINGHAM DR.	DATE: 08/24/2007
	LOG NUMBER: 200706083
	PAGE: 1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

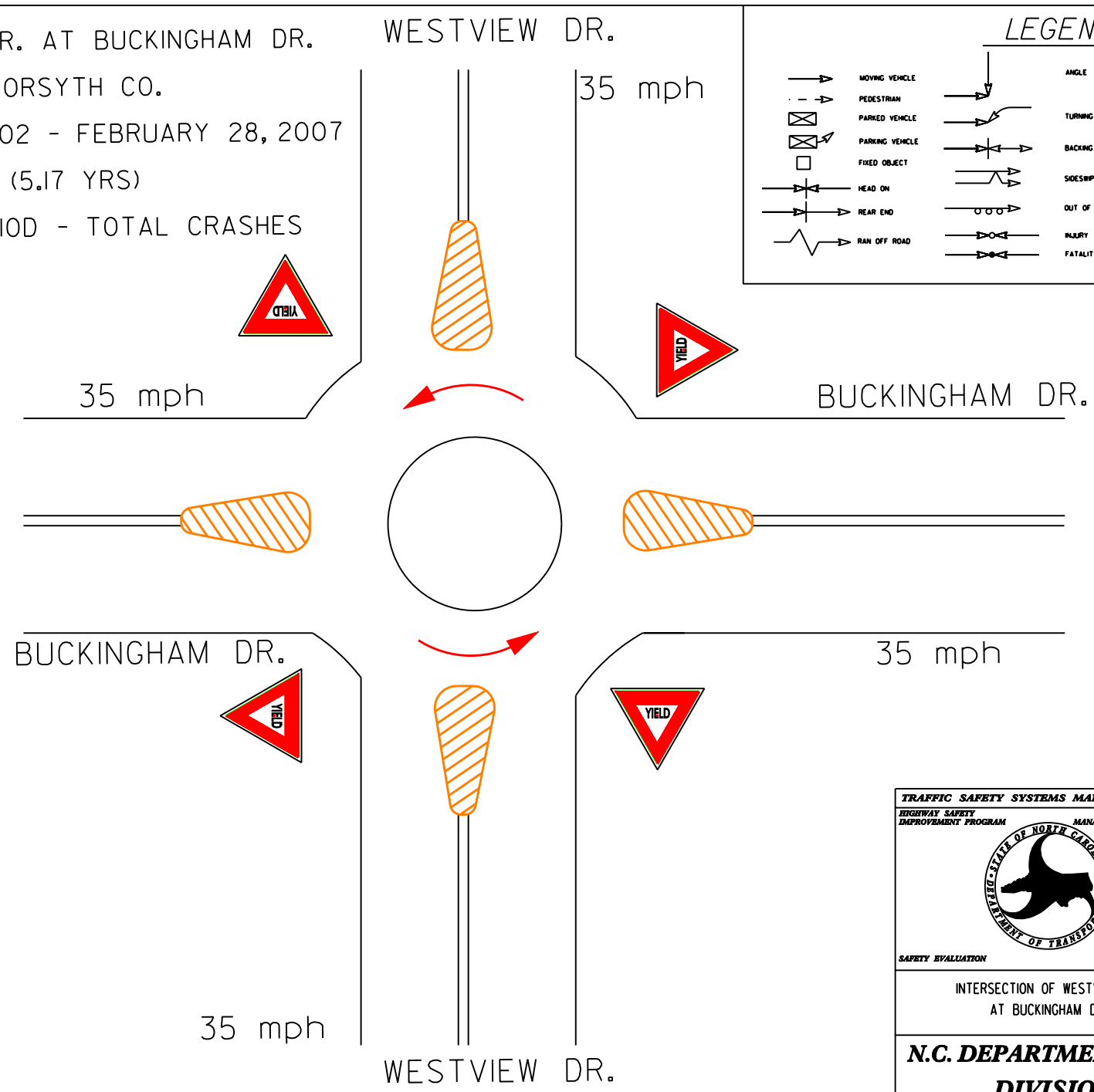
WESTVIEW DR. AT BUCKINGHAM DR.

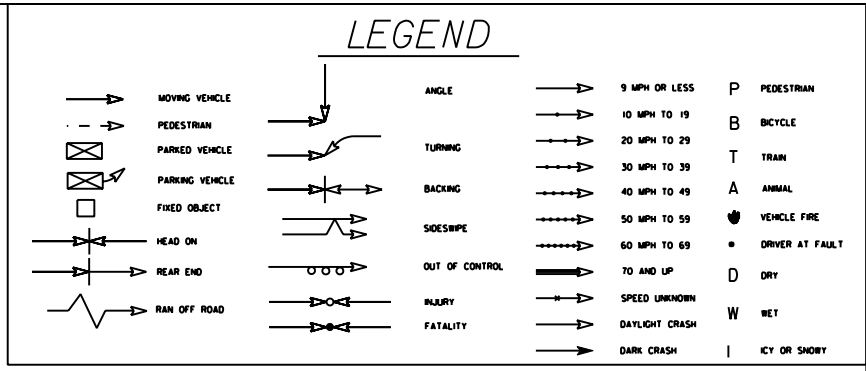
FORSYTH CO.

JANUARY 1, 2002 - FEBRUARY 28, 2007

(5.17 YRS)

AFTER PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF WESTVIEW DR.
AT BUCKINGHAM DR.

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 01/01/02 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/24/2008
LOG NUMBER:	200706083
PAGE:	1OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

WT Weaver at University Heights

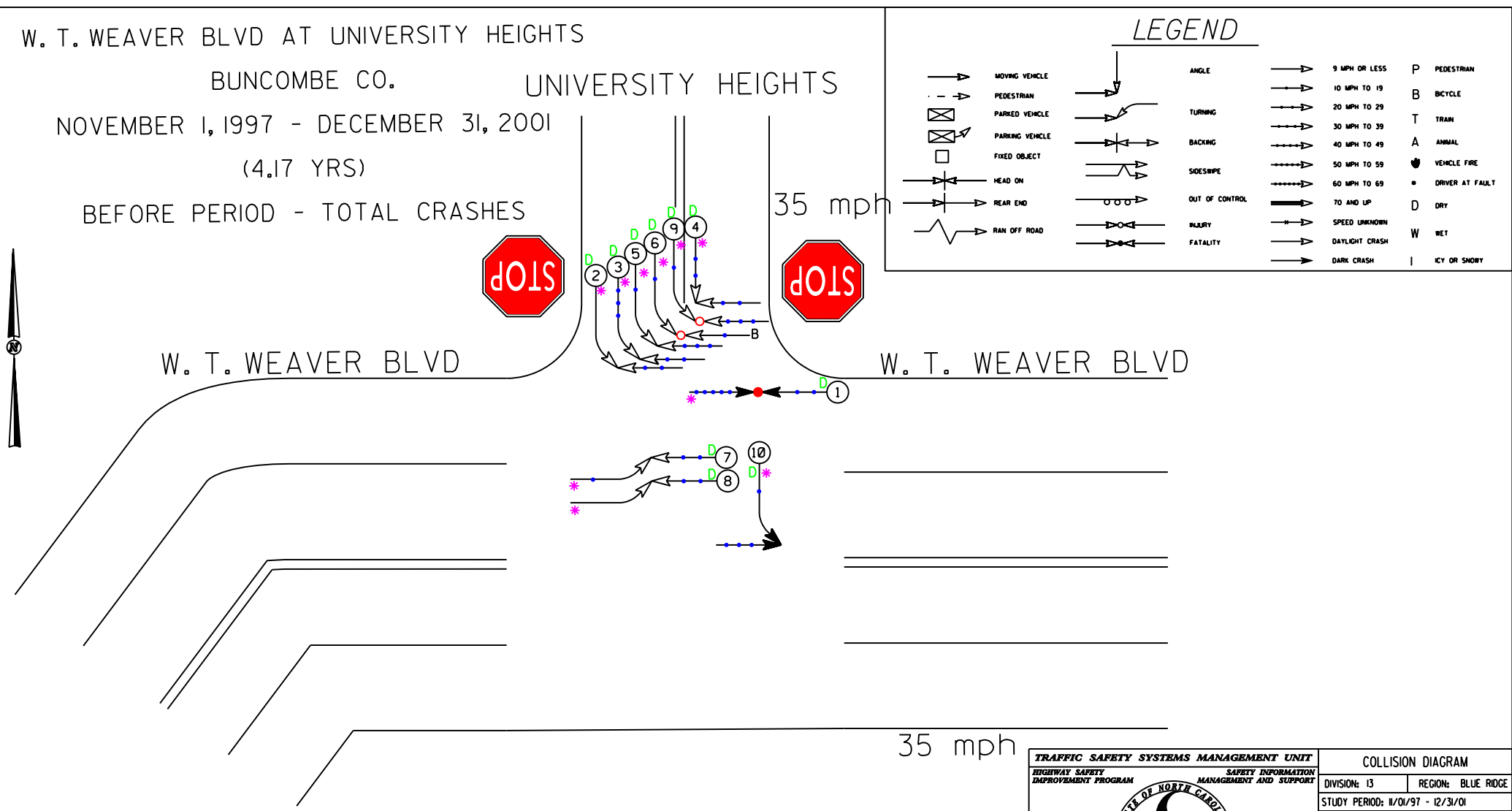
W. T. WEAVER BLVD AT UNIVERSITY HEIGHTS

BUNCOMBE CO.

NOVEMBER 1, 1997 - DECEMBER 31, 2001

(4.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF WT WEAVER BLVD
AT UNIVERSITY HEIGHTS

COLLISION DIAGRAM

DIVISION: 13	REGION: BLUE RIDGE
STUDY PERIOD: 11/01/97 - 12/31/01	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	09/04/2006
LOG NUMBER:	20060215A
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

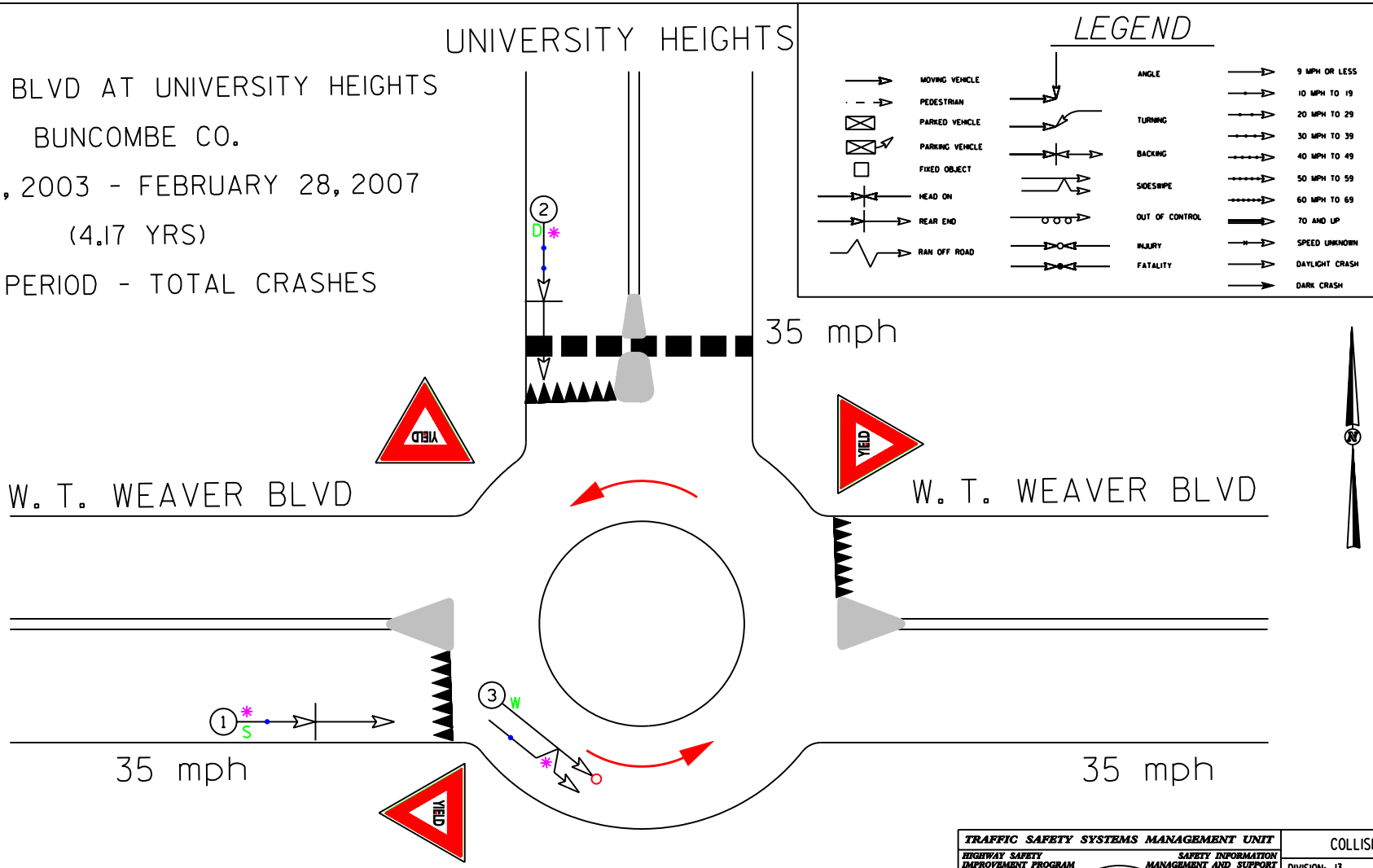
W. T. WEAVER BLVD AT UNIVERSITY HEIGHTS

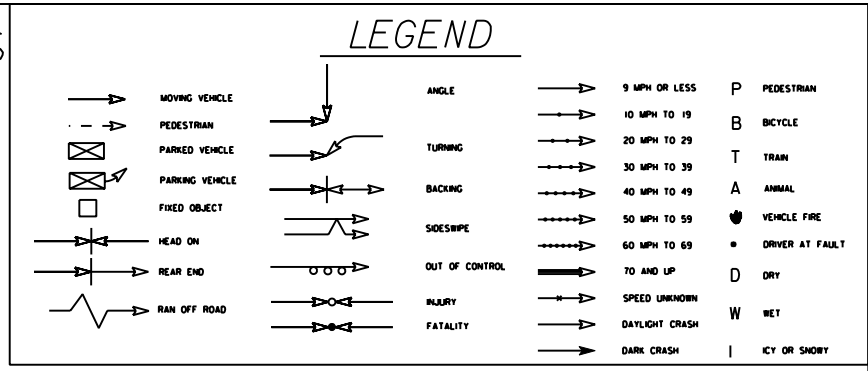
BUNCOMBE CO.

JANUARY 1, 2003 - FEBRUARY 28, 2007

(4.17 YRS)

AFTER PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF W. T. WEAVER BLVD AT UNIVERSITY HEIGHTS

COLLISION DIAGRAM

DIVISION: 13	REGION: BLUE RIDGE
STUDY PERIOD: 11/1/03 - 2/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	9/04/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION

DIVISION of HIGHWAYS

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

NC 801 at I-40 EB Ramp

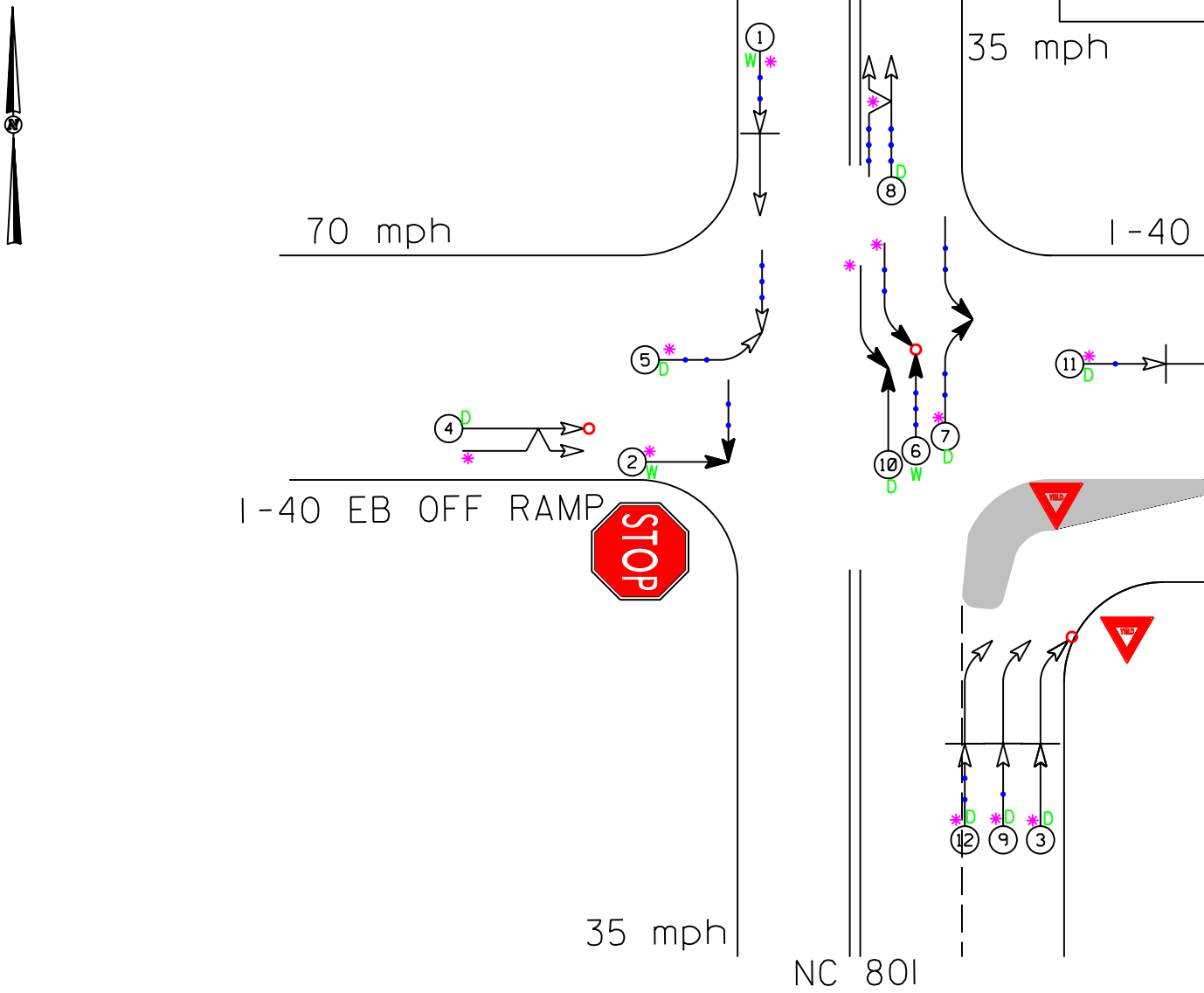
NC 801 AT I-40 EB RAMPS

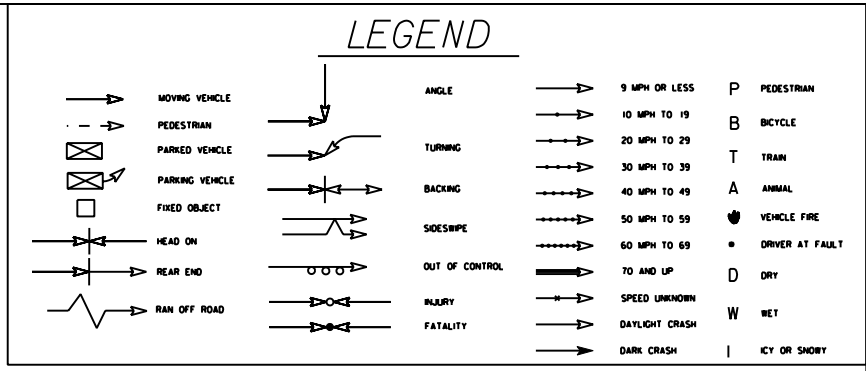
DAVIE CO.

NOVEMBER 1, 1997 - DECEMBER 31, 2001

(4.17 YRS)

BEFORE PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF NC 801 AT I-40 EB RAMPS

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 11/01/97 - 12/31/01	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	09/04/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION

DIVISION of HIGHWAYS

TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

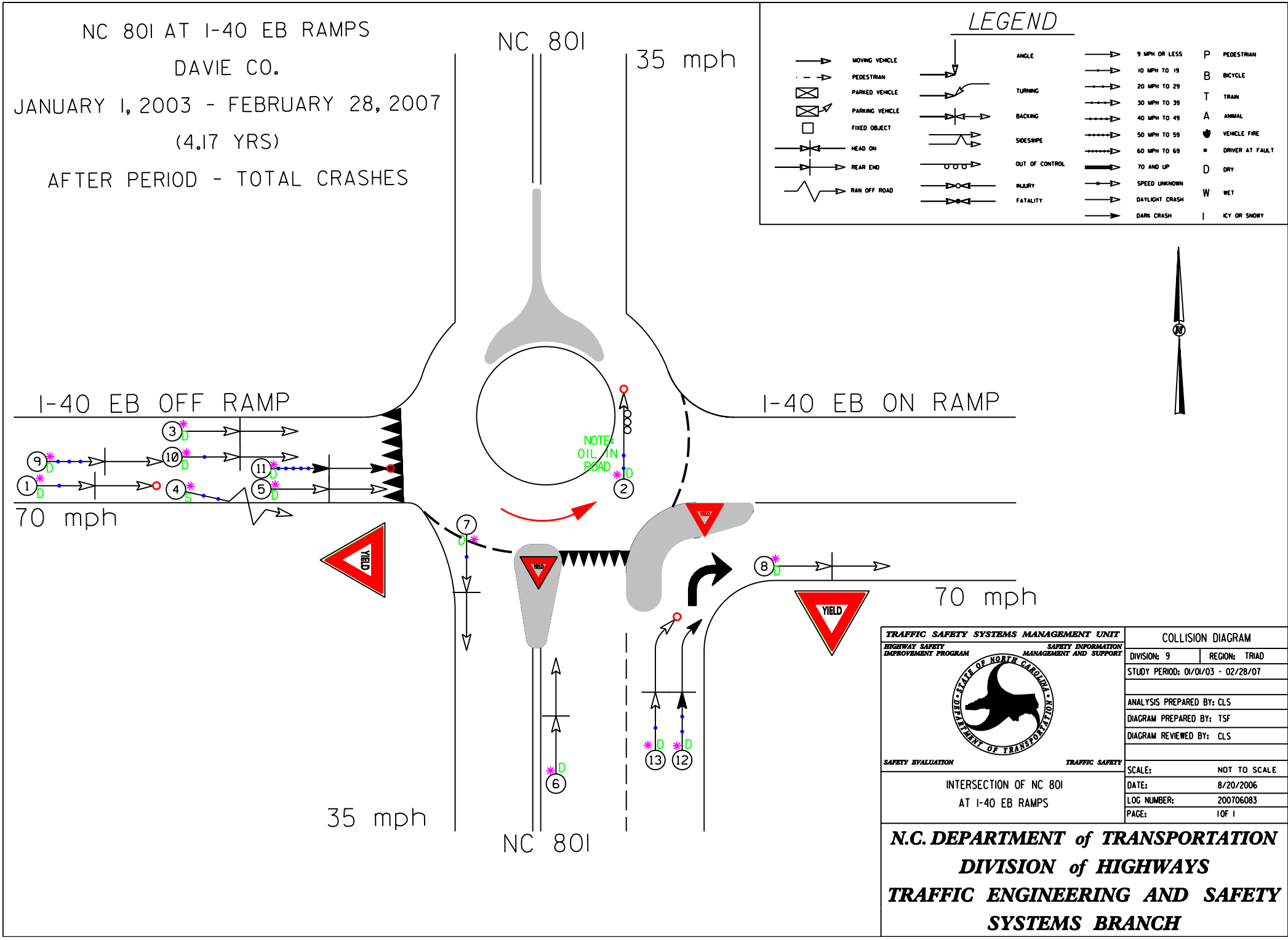
NC 801 AT I-40 EB RAMPS

DAVIE CO.

JANUARY 1, 2003 - FEBRUARY 28, 2007

(4.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF NC 801
AT I-40 EB RAMPS

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 01/01/03 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/20/2006
LOG NUMBER:	200706083
PAGE:	1OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

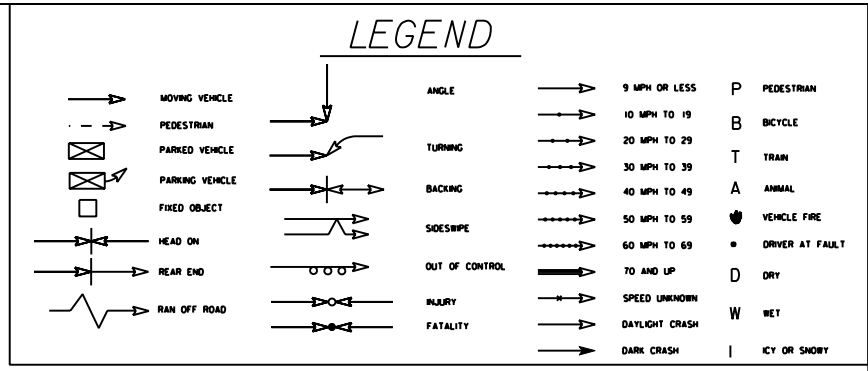
Lake at Mountain

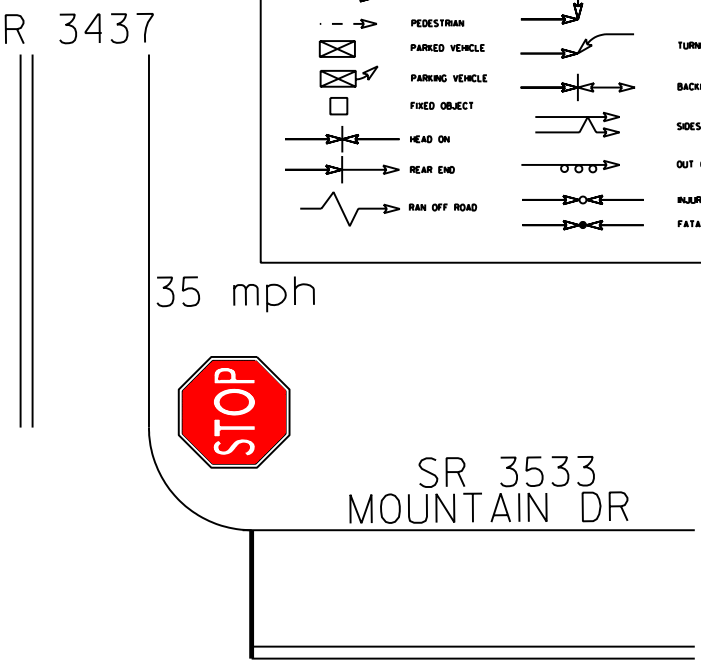
LAKE RD AT MOUNTAIN DR

BUNCOMBE CO.

NOVEMBER 1, 1997 - DECEMBER 31, 2001
(4.17 YRS)

BEFORE PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF SR 3533 MOUNTAIN DR.
AT SR 3437 LAKE RD

COLLISION DIAGRAM

DIVISION: 13	REGION: BLUE RIDGE
STUDY PERIOD: 11/01/97 - 12/31/01	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/31/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

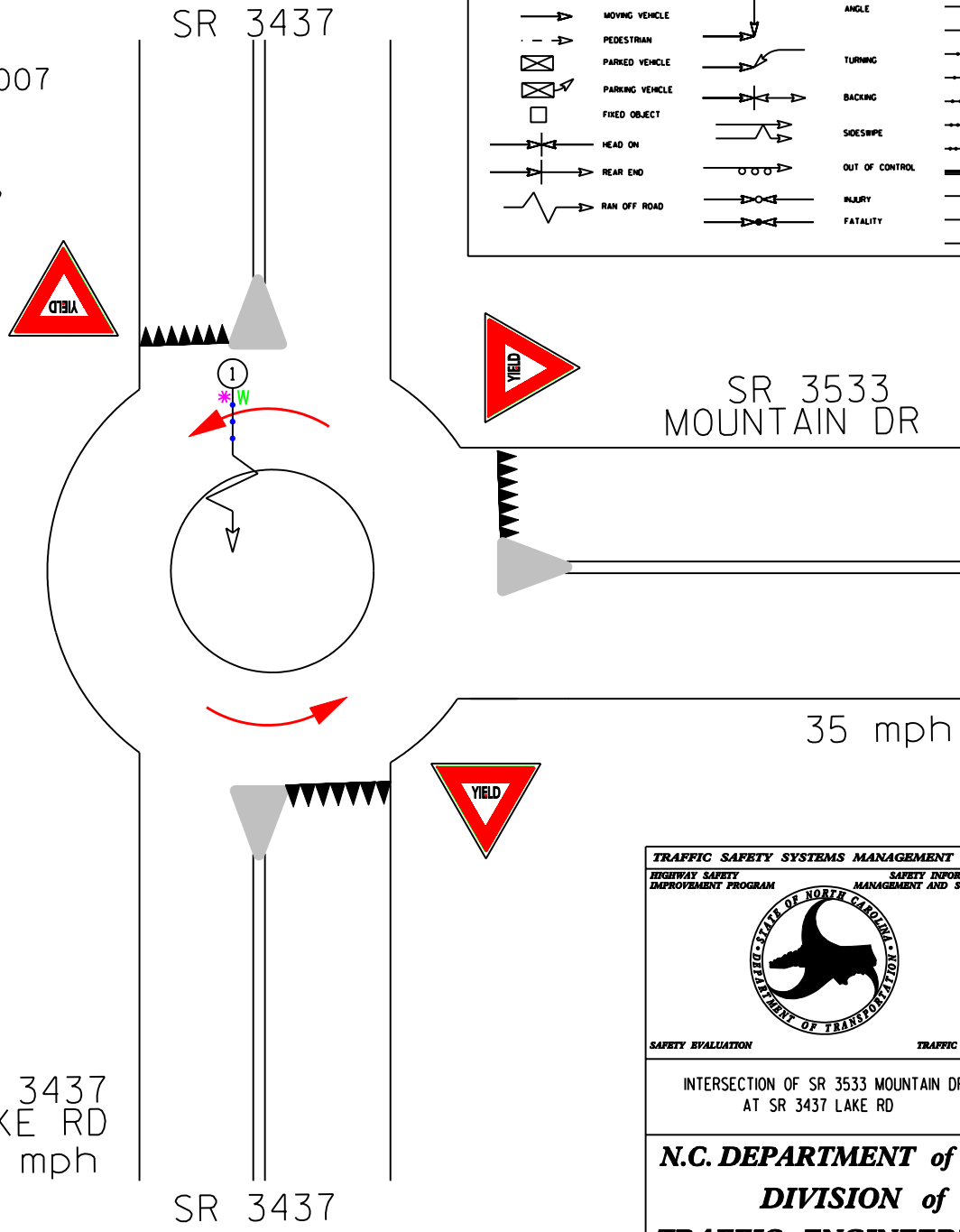
LAKE RD AT MOUNTAIN DR

BUNCOMBE CO.

JANUARY 1, 2003 - FEBRUARY 28, 2007

(4.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
* DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM — *SAFETY INFORMATION MANAGEMENT AND SUPPORT*

SAFETY EVALUATION — *TRAFFIC SAFETY*

INTERSECTION OF SR 3533 MOUNTAIN DR.
AT SR 3437 LAKE RD

COLLISION DIAGRAM

DIVISION: 13	REGION: BLUE RIDGE
STUDY PERIOD: 01/01/02 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/31/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

GROUP 2

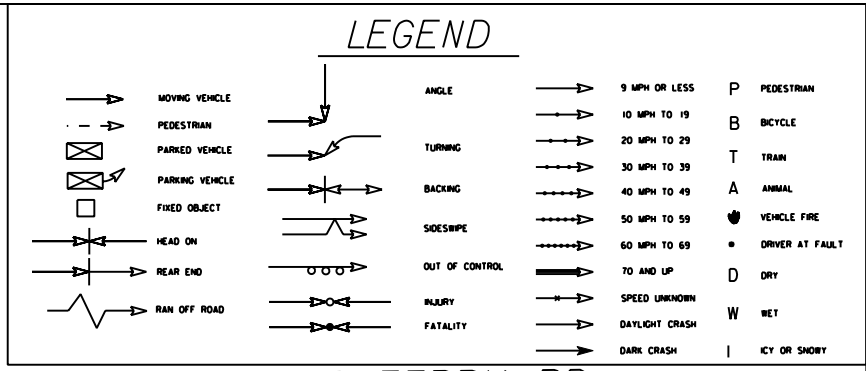
Styers Ferry at Utility

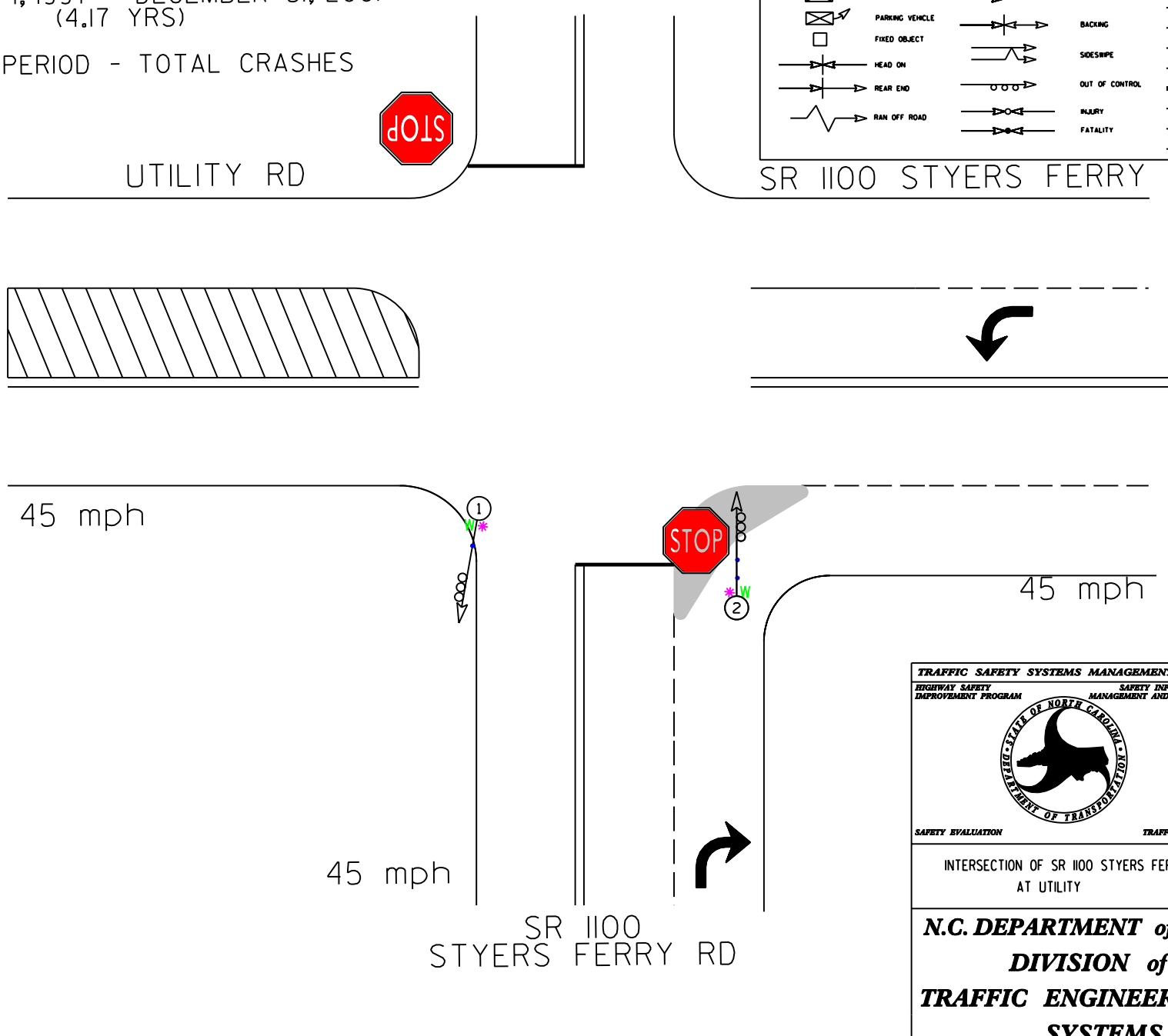
STYERS FERRY AT UTILITY

FORSYTH CO.

NOVEMBER 1, 1997 - DECEMBER 31, 2001
(4.17 YRS)

BEFORE PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF SR 1100 STYERS FERRY AT UTILITY

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 11/01/03 - 12/31/2001	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/29/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

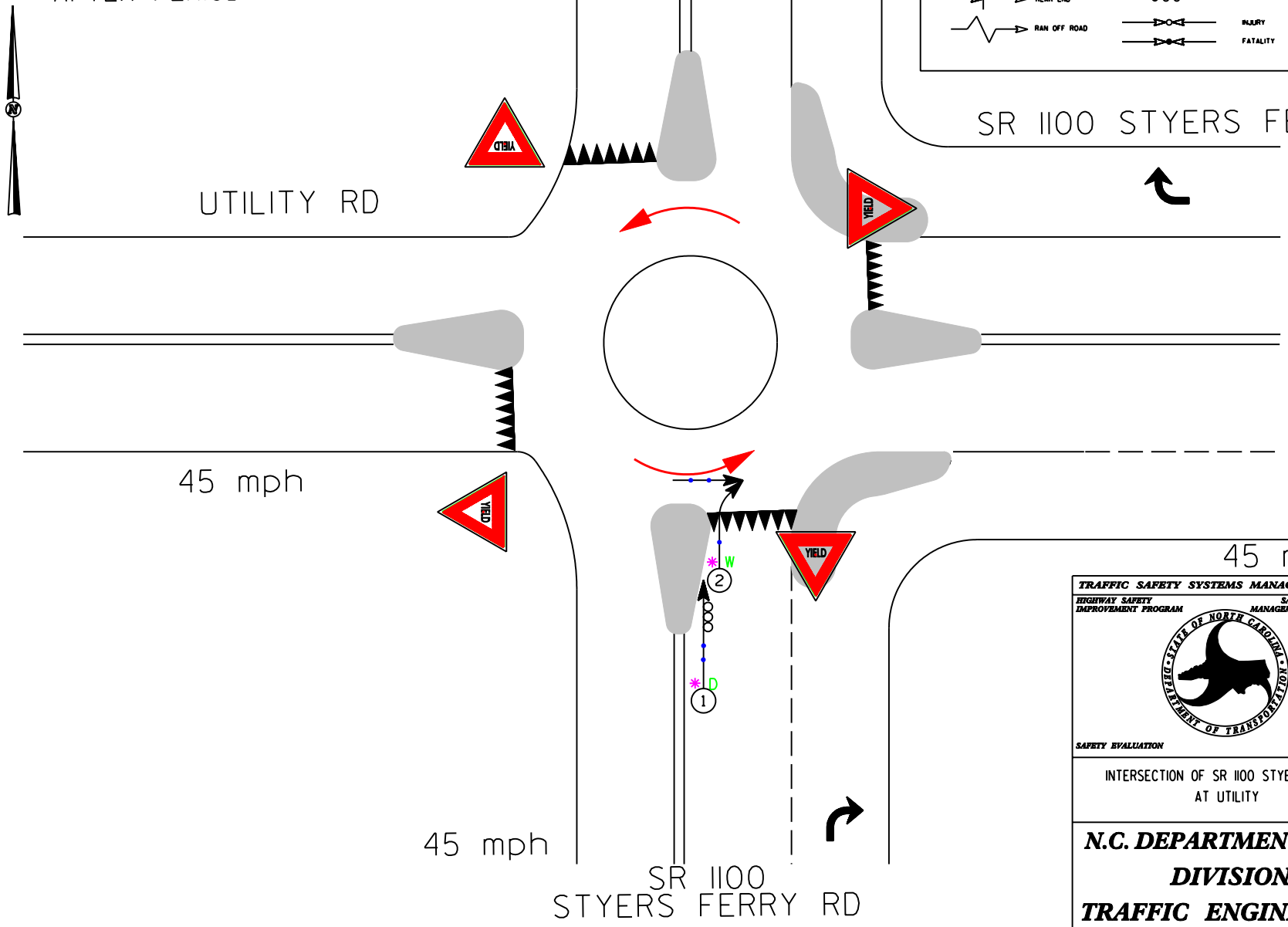
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

STYERS FERRY AT UTILITY

FORSYTH CO.

JANUARY 1, 2003 - FEBRUARY 28, 2007
(4.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

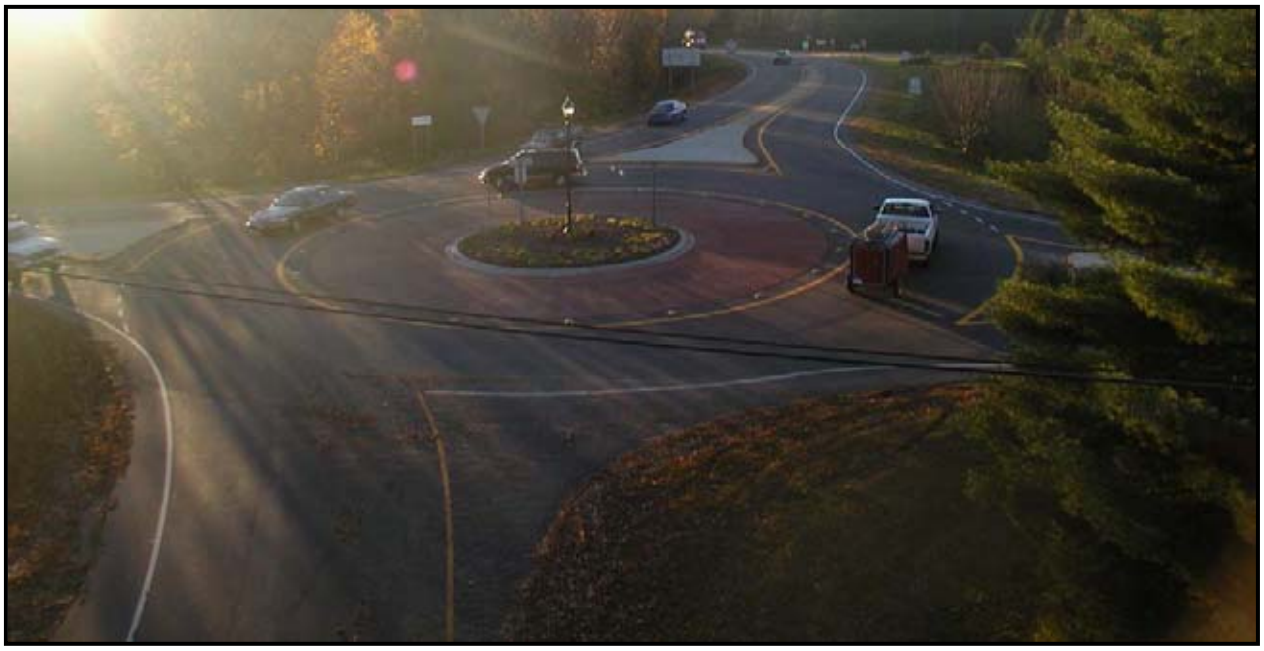
INTERSECTION OF SR 1100 STYERS FERRY AT UTILITY

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 01/01/03 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/30/2007
LOG NUMBER:	20070608 3
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

Williams Road at US 421 SB Ramps

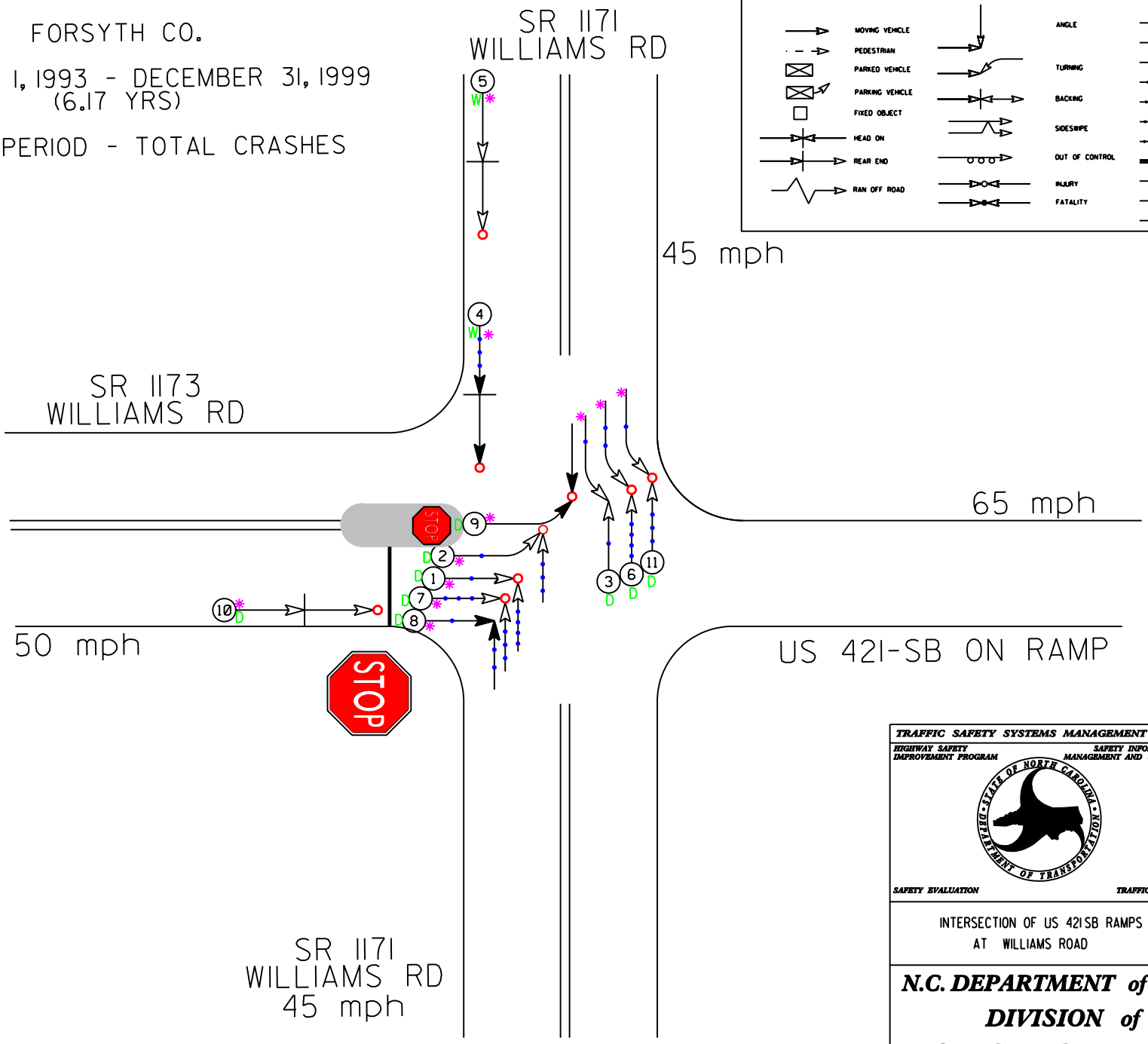


WILLIAMS RD AT US 421-SB RAMPS

FORSYTH CO.

NOVEMBER 1, 1993 - DECEMBER 31, 1999
(6.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

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9 MPH OR LESS
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30 MPH TO 39
40 MPH TO 49
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SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF US 421SB RAMPS
AT WILLIAMS ROAD

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 11/01/93 - 12/31/99	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	
DATE:	08/28/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

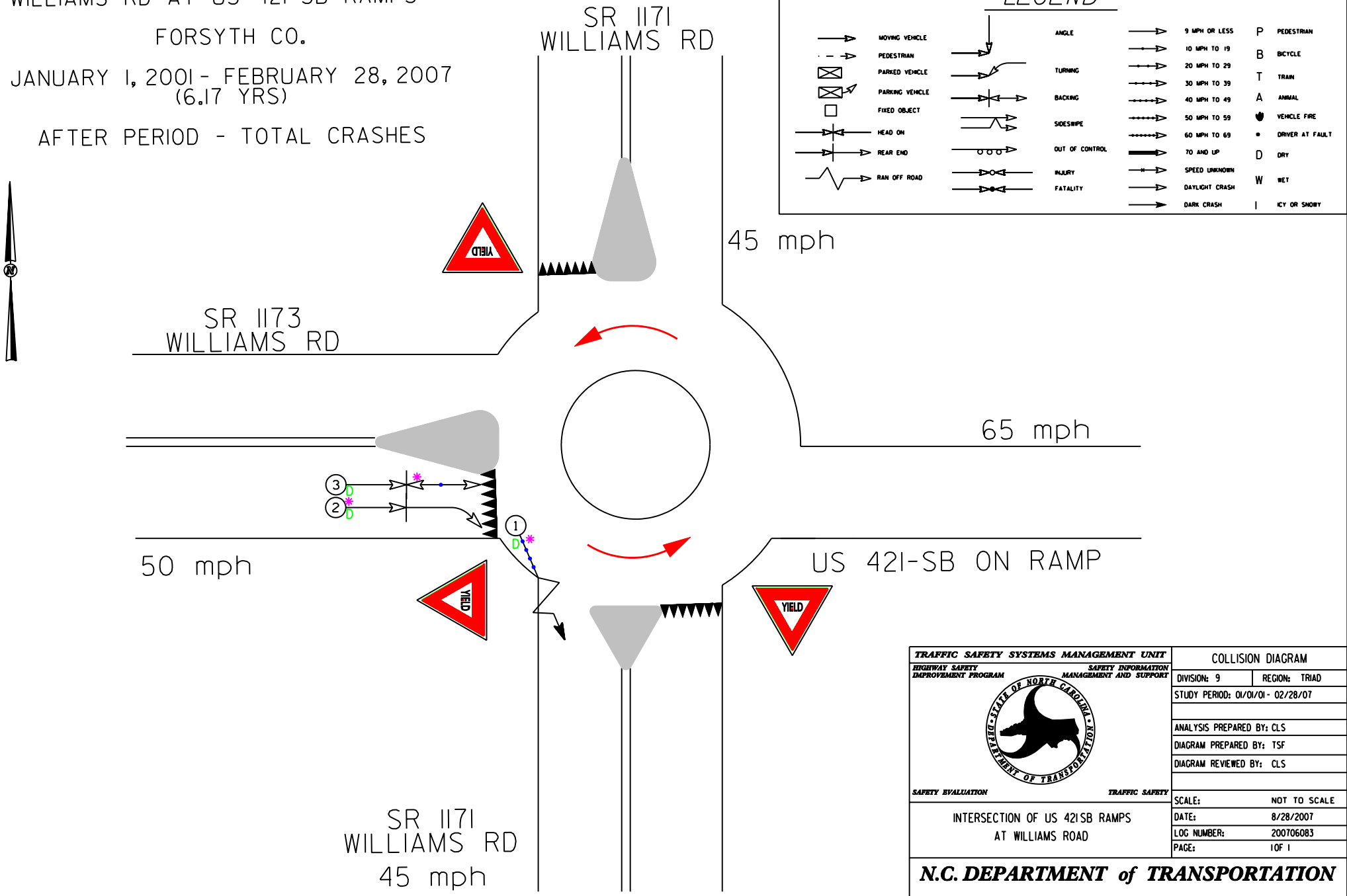
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

WILLIAMS RD AT US 421-SB RAMPS

FORSYTH CO.

JANUARY 1, 2001 - FEBRUARY 28, 2007
(6.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
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FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
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70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF US 421SB RAMPS
AT WILLIAMS ROAD

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 01/01/01 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/28/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

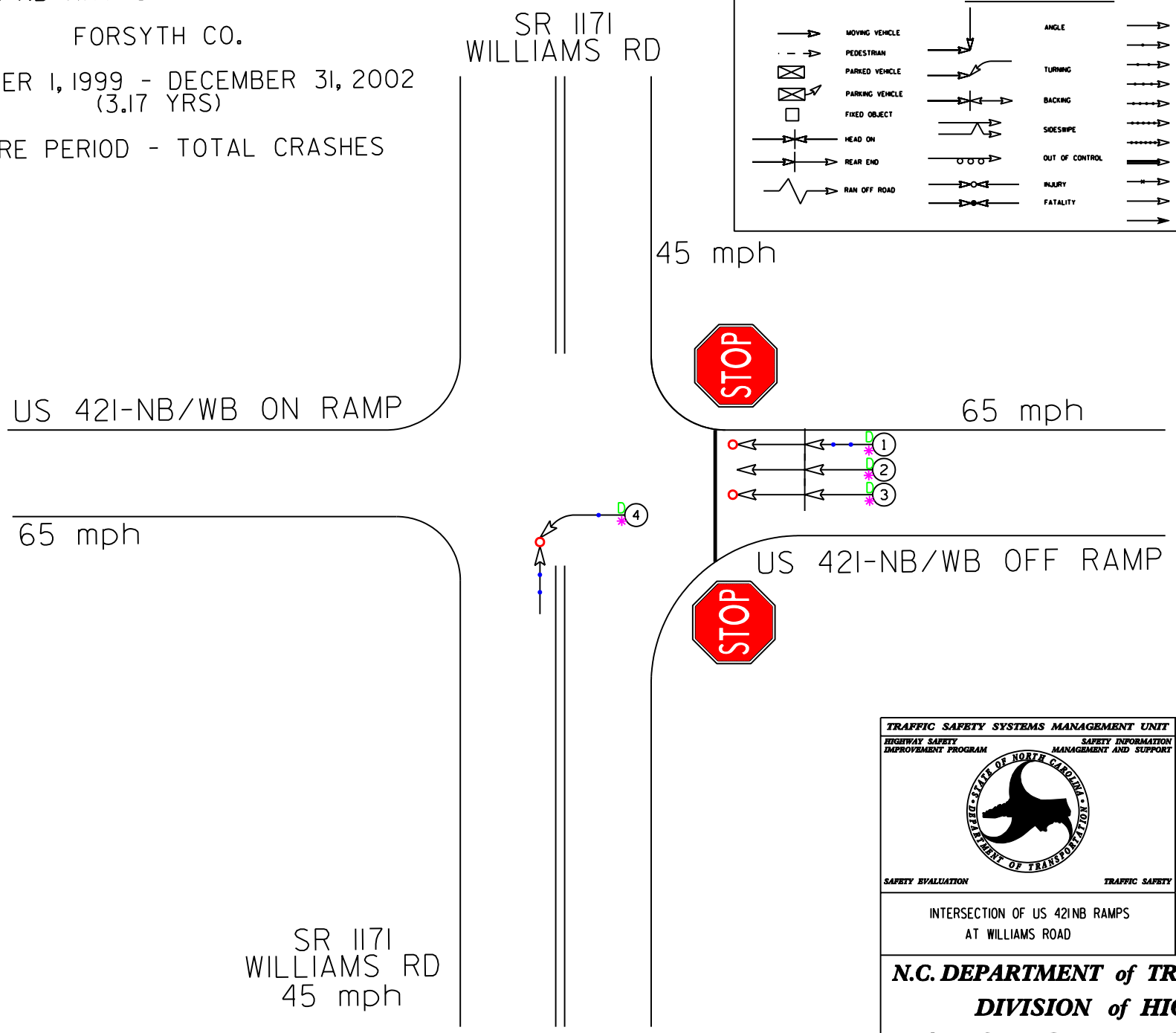
Williams at US 421 NB Ramps

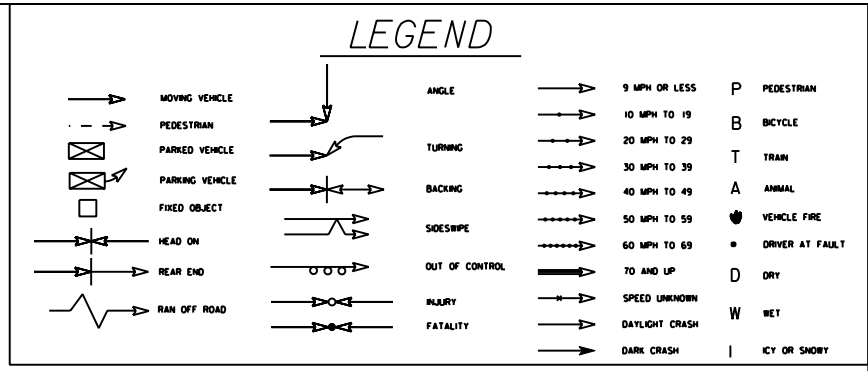
US 421-NB RAMPS AT WILLIAMS RD

FORSYTH CO.

NOVEMBER 1, 1999 - DECEMBER 31, 2002
(3.17 YRS)

BEFORE PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF US 421NB RAMPS
AT WILLIAMS ROAD

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 11/01/99 - 12/31/02	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/28/2007
LOG NUMBER:	200706083
PAGE:	1OF 1

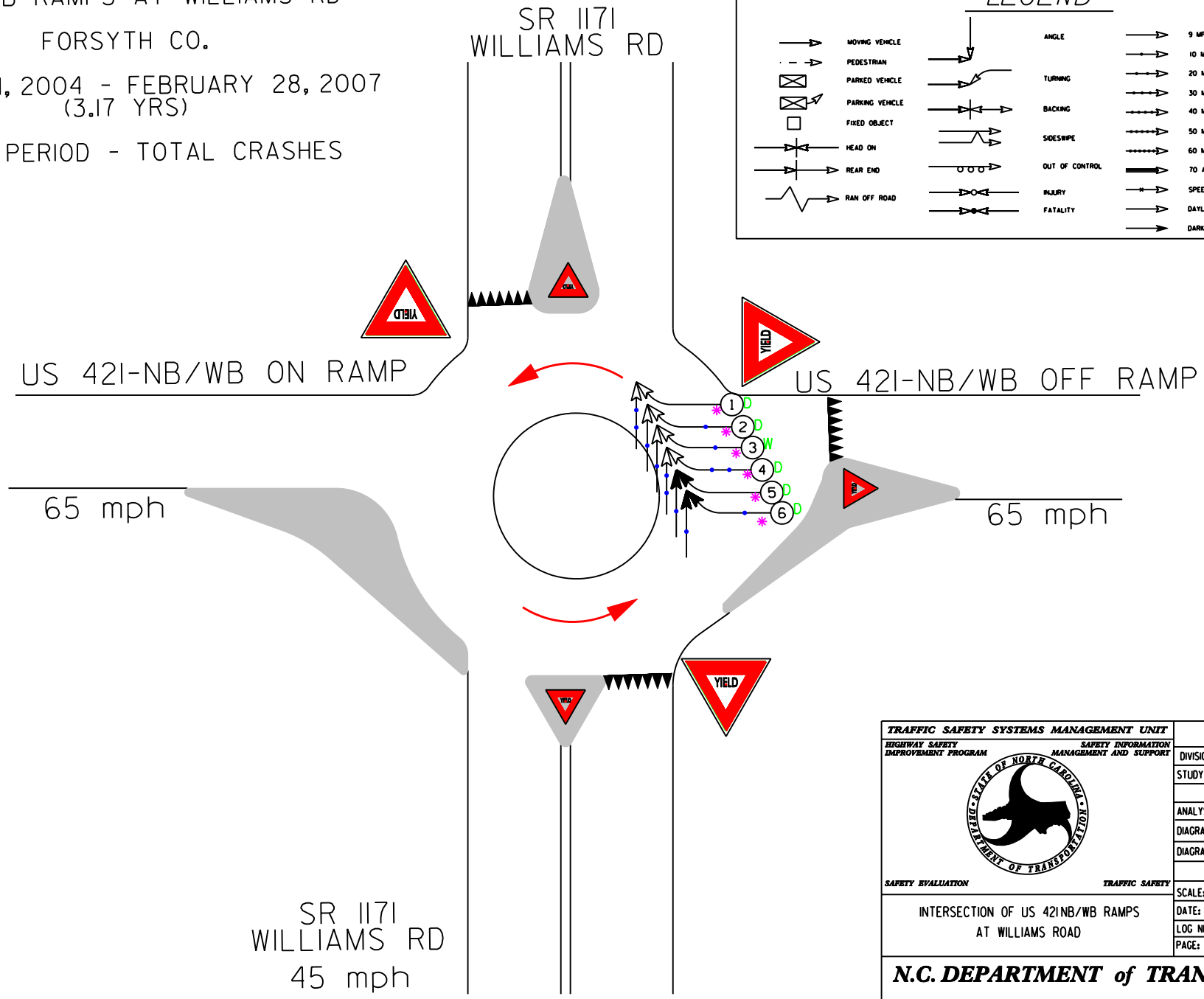
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

US 421-NB RAMPS AT WILLIAMS RD

FORSYTH CO.

JANUARY 1, 2004 - FEBRUARY 28, 2007
(3.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM — *SAFETY INFORMATION MANAGEMENT AND SUPPORT*

SAFETY EVALUATION — *TRAFFIC SAFETY*

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 01/01/04 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/28/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

INTERSECTION OF US 421NB/WB RAMPS
AT WILLIAMS ROAD

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

NC 751 at Old Erwin

NC 751 AT OLD ERWIN RD

DURHAM CO.

NOVEMBER 1, 1999 - DECEMBER 31, 2002
(3.17 YRS)

BEFORE PERIOD - TOTAL CRASHES

LEGEND

MOVING VEHICLE	ANGLE	9 MPH OR LESS	P	PEDESTRIAN
PEDESTRIAN		10 MPH TO 19	B	BICYCLE
PARKED VEHICLE	TURNING	20 MPH TO 29	T	TRAIN
PARKING VEHICLE	BACKING	30 MPH TO 39	A	ANIMAL
FIXED OBJECT	SIDESWIPE	40 MPH TO 49		VEHICLE FIRE
HEAD ON	OUT OF CONTROL	50 MPH TO 59		DRIVER AT FAULT
REAR END	INJURY	60 MPH TO 69	D	DRY
RAN OFF ROAD	FATALITY	70 AND UP	W	WET
		SPEED UNKNOWN	I	ICY OR SNOWY
		DAYLIGHT CRASH		
		DARK CRASH		

SERVICE ROAD
FOR
DUKE FOREST

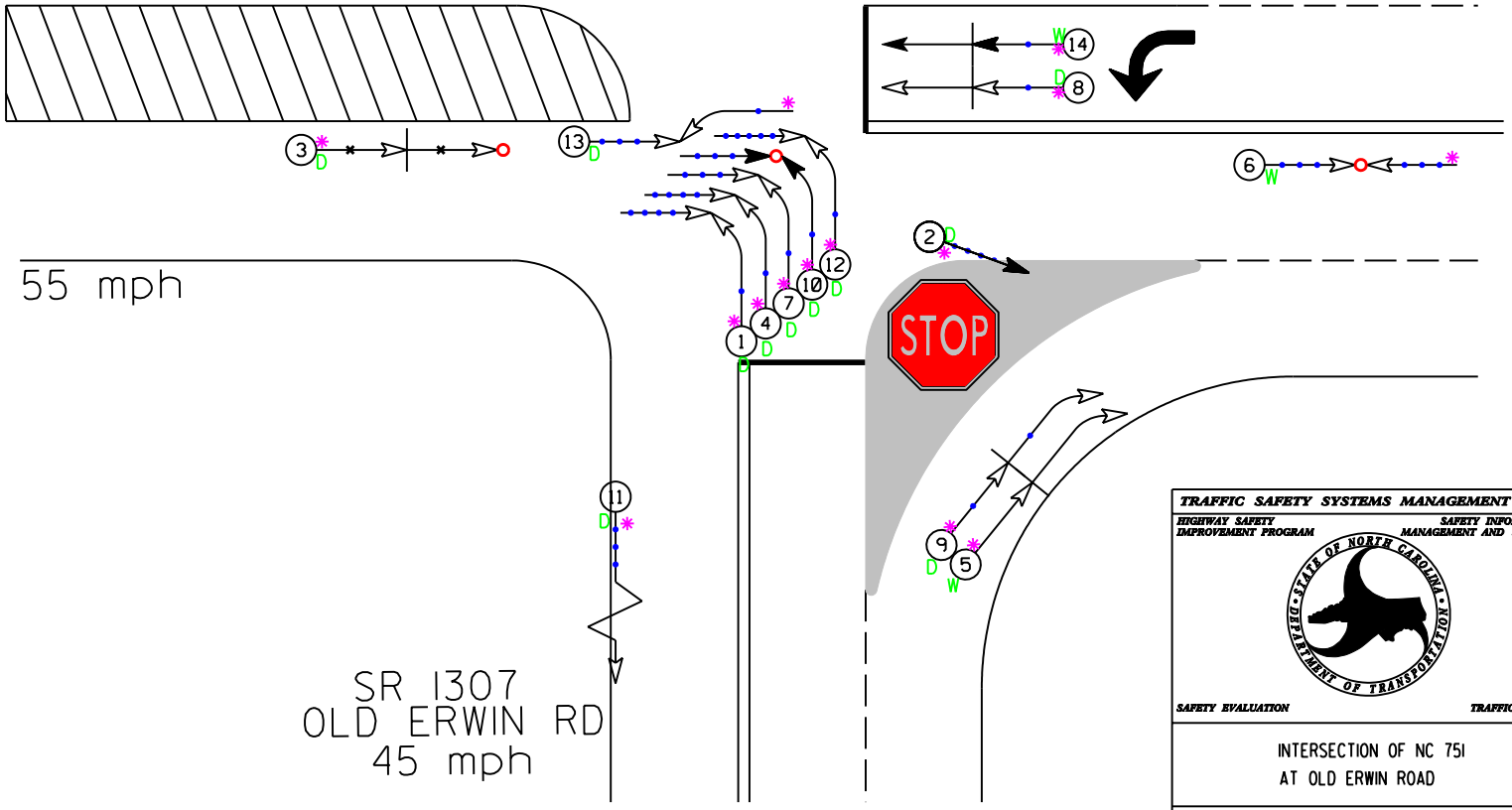
NC 751

NC 751

55 mph

STOP

SR 1307
OLD ERWIN RD
45 mph



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF NC 751
AT OLD ERWIN ROAD

COLLISION DIAGRAM

DIVISION: 5	REGION: CAPITAL
STUDY PERIOD: 11/01/99 - 12/31/2002	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/29/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

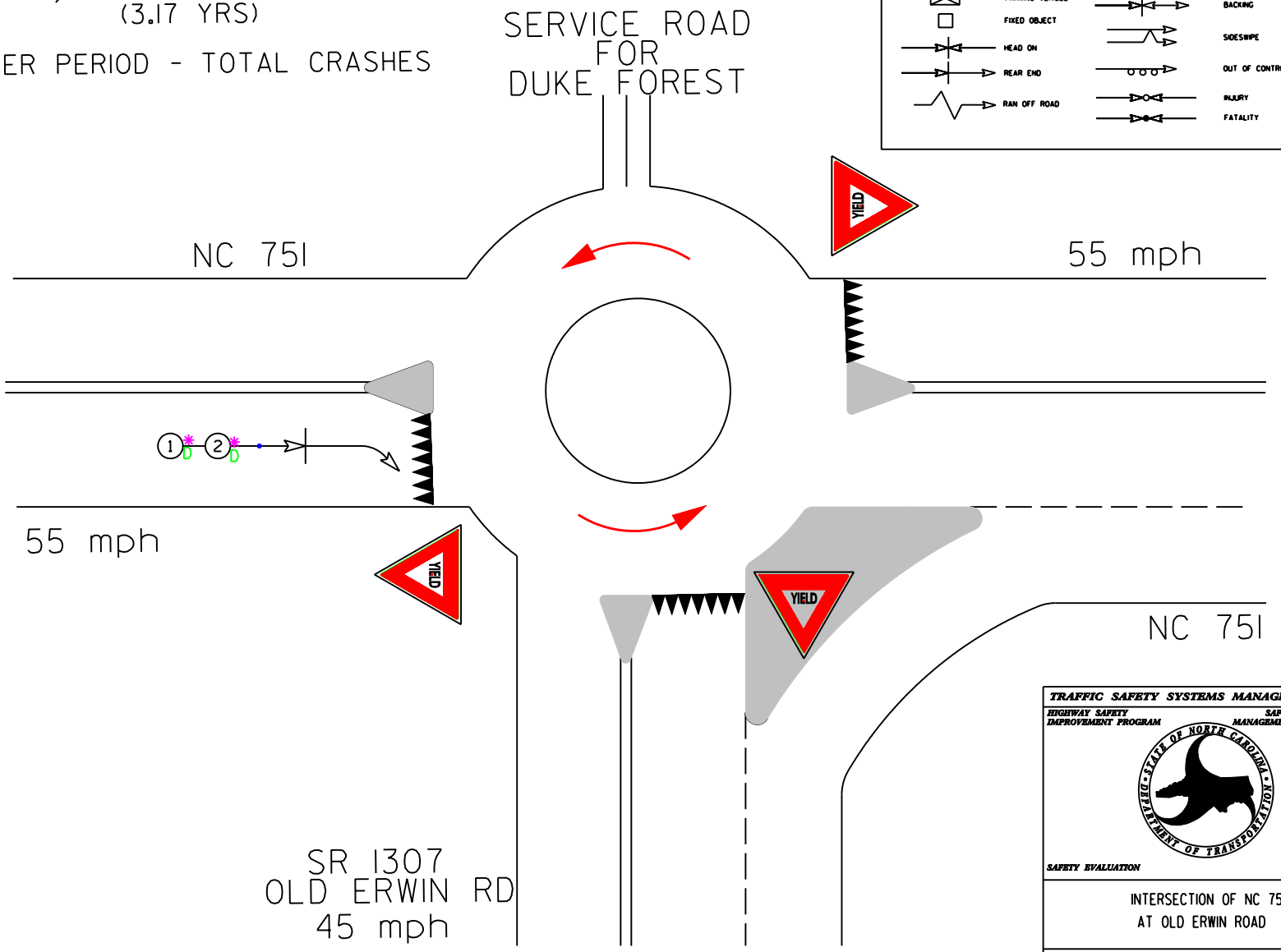
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

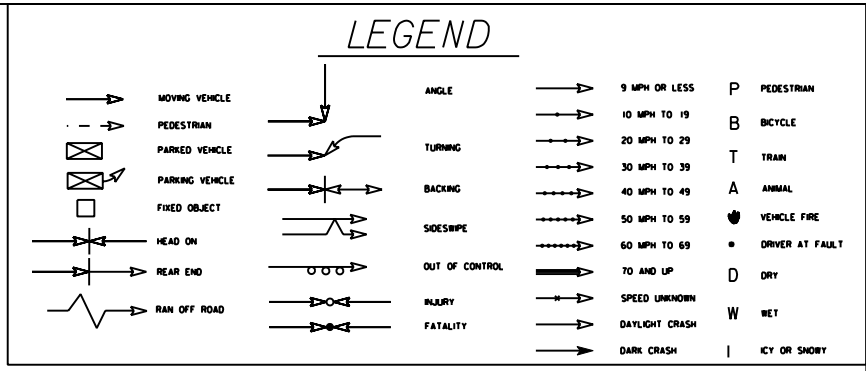
NC 751 AT OLD ERWIN RD

DURHAM CO.

JANUARY 1, 2004 - FEBRUARY 28, 2007
(3.17 YRS)

AFTER PERIOD - TOTAL CRASHES





TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF NC 751
AT OLD ERWIN ROAD

COLLISION DIAGRAM

DIVISION: 5	REGION: CAPITAL
STUDY PERIOD: 01/01/04 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/24/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

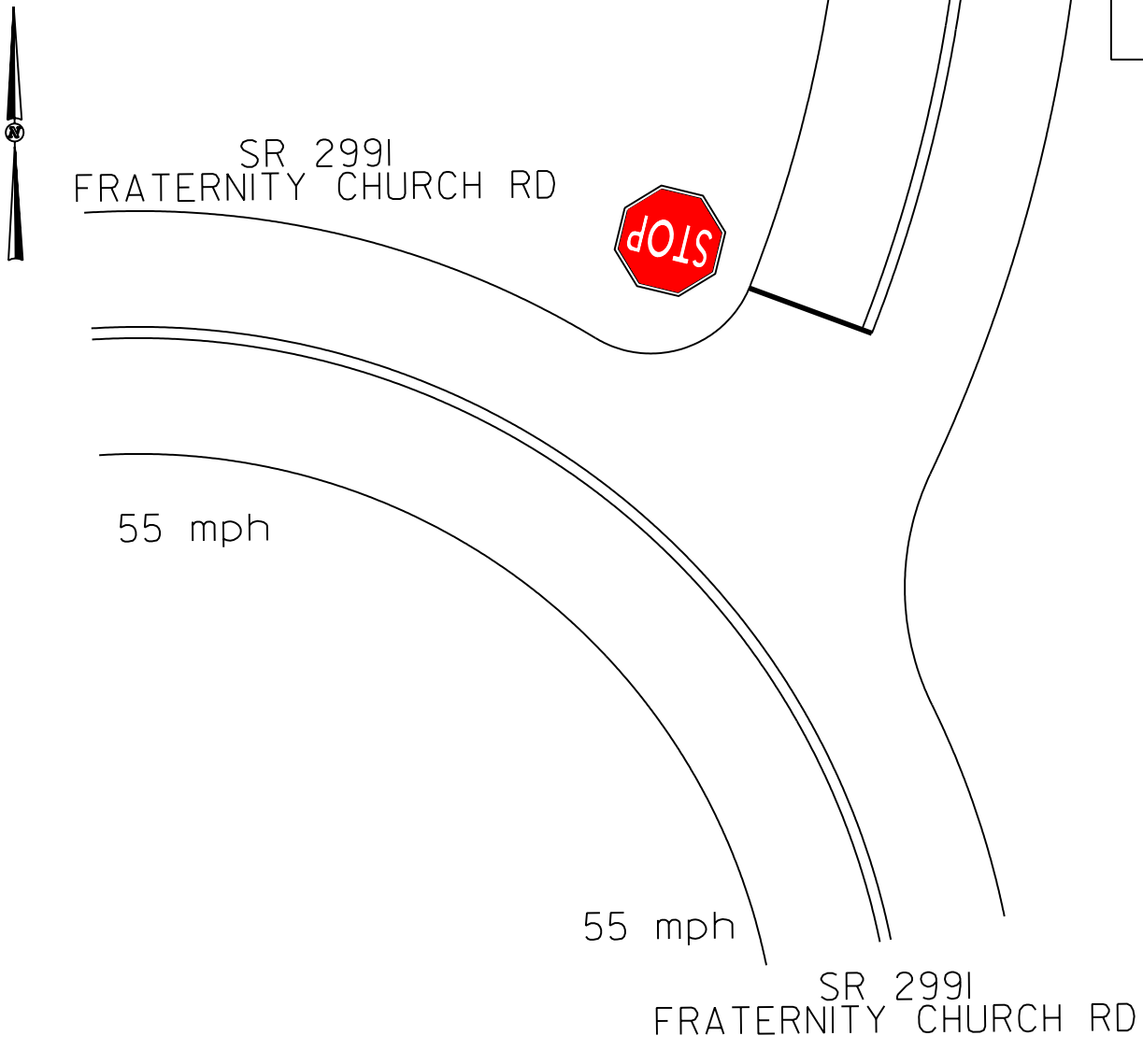
Fraternity Church at Hope Church

FRATERNITY CHURCH AT HOPE CHURCH

FORSYTH CO.

NOVEMBER 1, 1991 - DECEMBER 31, 1998
(7.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF FRATERNITY CH ROAD
AT HOPE CH ROAD

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 11/01/91 - 12/31/1998	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/29/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

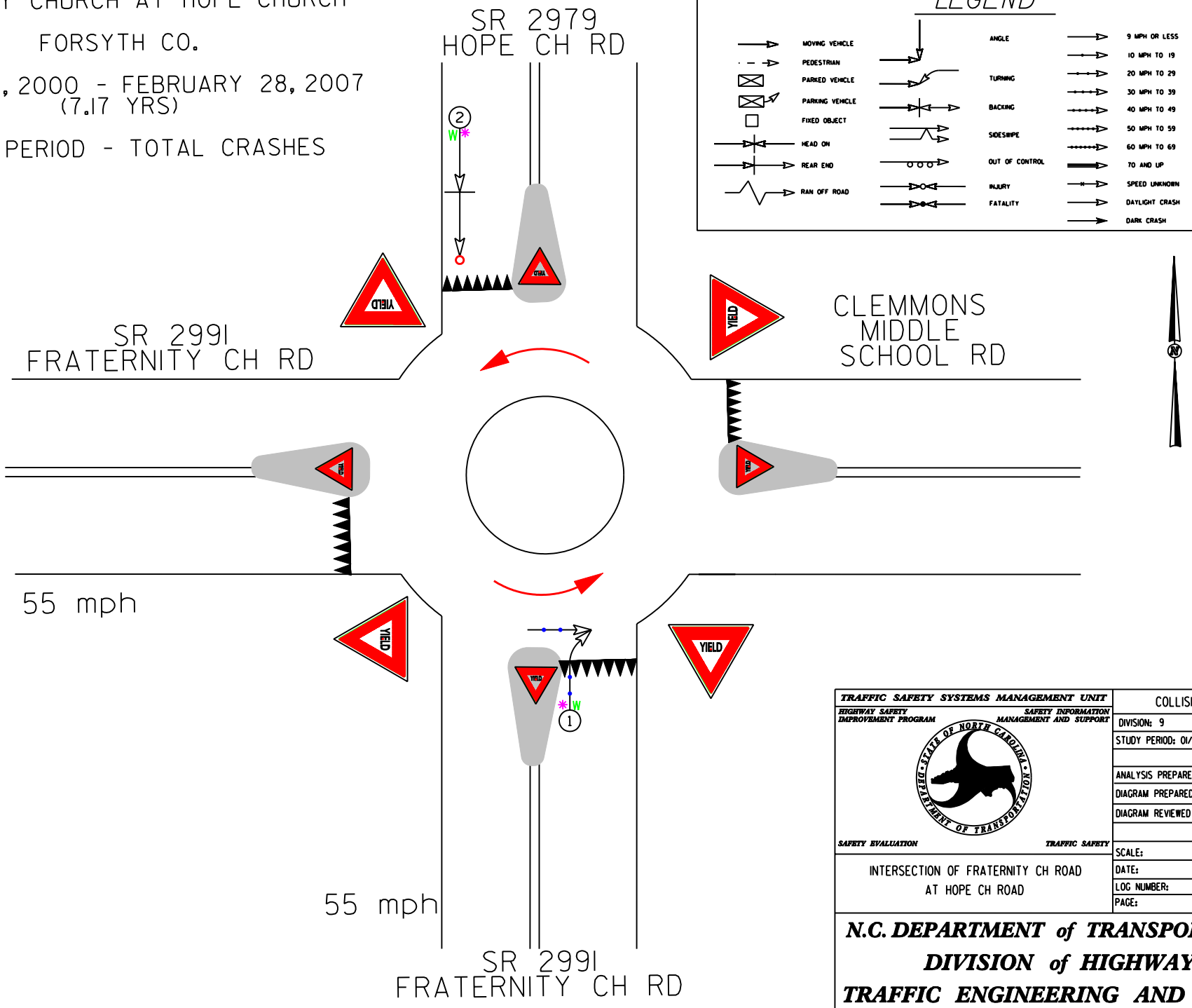
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

FRATERNITY CHURCH AT HOPE CHURCH

FORSYTH CO.

JANUARY 1, 2000 - FEBRUARY 28, 2007
(7.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF FRATERNITY CH ROAD
AT HOPE CH ROAD

COLLISION DIAGRAM

DIVISION: 9	REGION: TRIAD
STUDY PERIOD: 01/01/00 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/30/2007
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

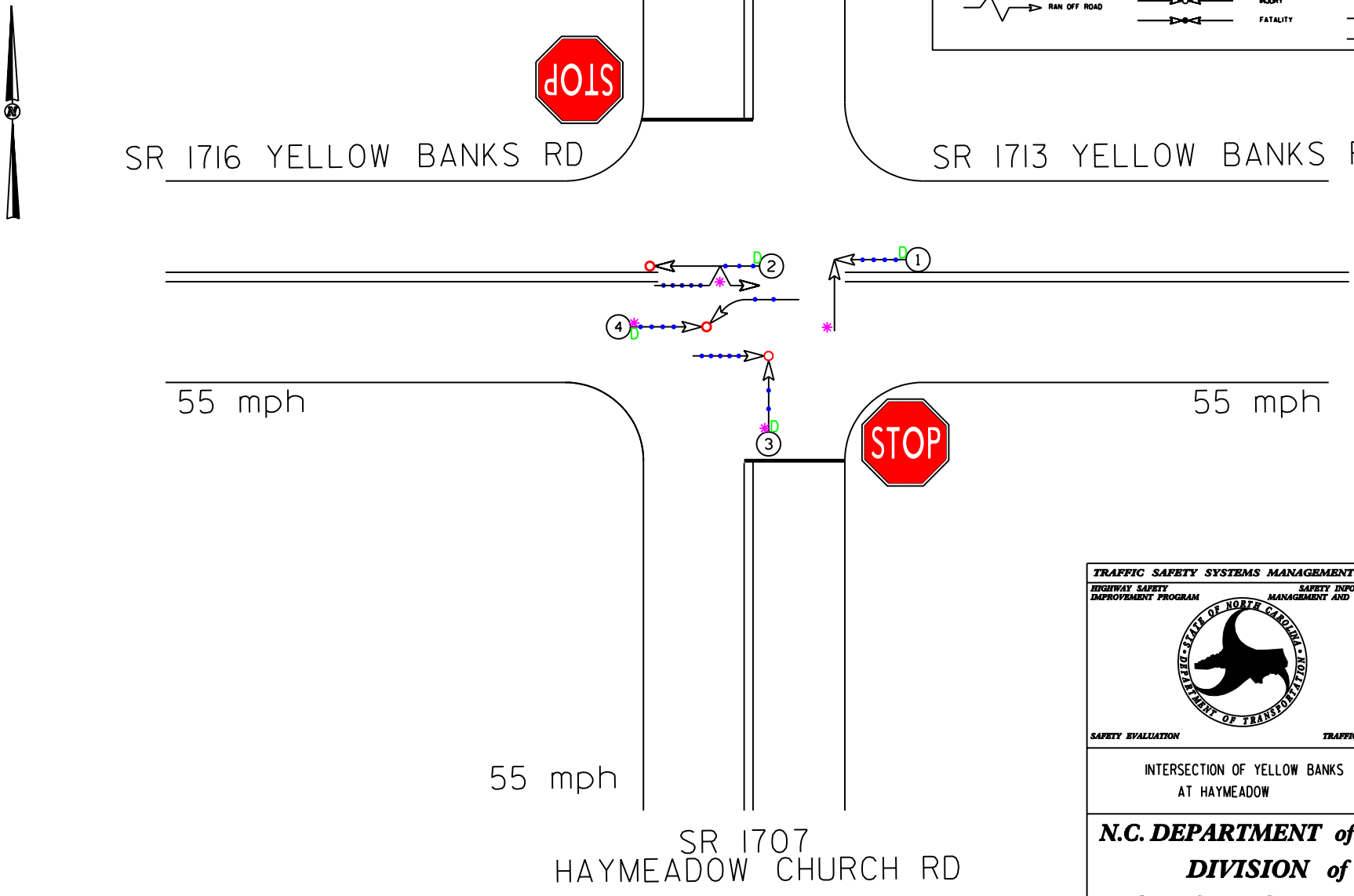
Yellowbanks at Haymeadow – No Photos Available

YELLOW BANKS AT HAYMEADOW

WILKES CO.

NOVEMBER 1, 1997 - DECEMBER 31, 2001
(4.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF YELLOW BANKS
AT HAYMEADOW

COLLISION DIAGRAM

DIVISION: II	REGION: HIGH
STUDY PERIOD: 11/01/97 - 12/31/2001	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	08/29/2007
LOG NUMBER:	200706083
PAGE:	1OF 1

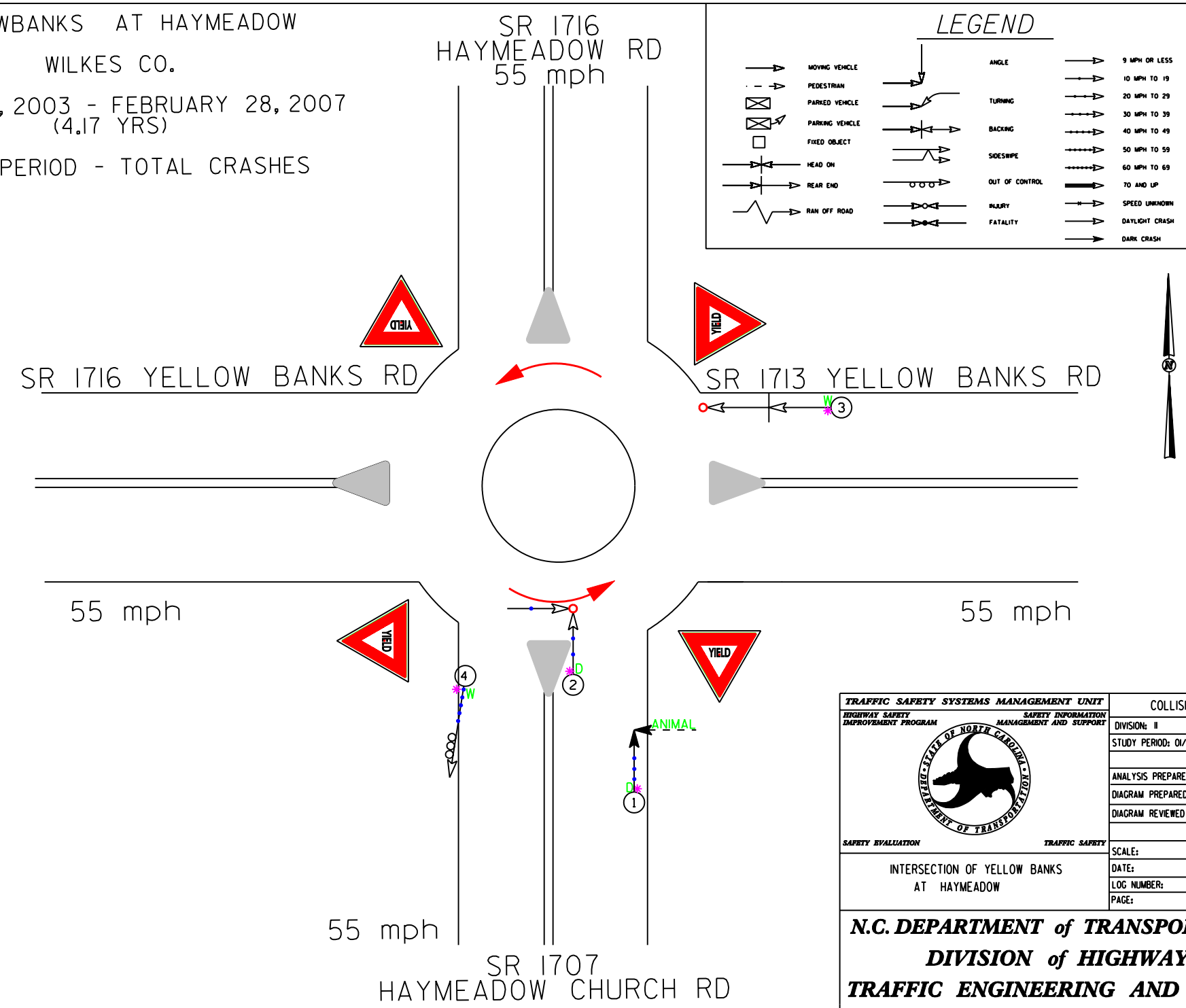
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

YELLOWBANKS AT HAYMEADOW

WILKES CO.

JANUARY 1, 2003 - FEBRUARY 28, 2007
(4.17 YRS)

AFTER PERIOD - TOTAL CRASHES



LEGEND

MOVING VEHICLE
PEDESTRIAN
PARKED VEHICLE
PARKING VEHICLE
FIXED OBJECT
HEAD ON
REAR END
RAN OFF ROAD

ANGLE
TURNING
BACKING
SIDESWIPE
OUT OF CONTROL
INJURY
FATALITY

9 MPH OR LESS
10 MPH TO 19
20 MPH TO 29
30 MPH TO 39
40 MPH TO 49
50 MPH TO 59
60 MPH TO 69
70 AND UP
SPEED UNKNOWN
DAYLIGHT CRASH
DARK CRASH

P PEDESTRIAN
B BICYCLE
T TRAIN
A ANIMAL
VEHICLE FIRE
DRIVER AT FAULT
D DRY
W WET
I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF YELLOW BANKS
AT HAYMEADOW

COLLISION DIAGRAM

DIVISION: II	REGION: HIGH
STUDY PERIOD: 01/01/03 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	8/30/2007
LOG NUMBER:	200706083
PAGE:	1OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

GROUP 3

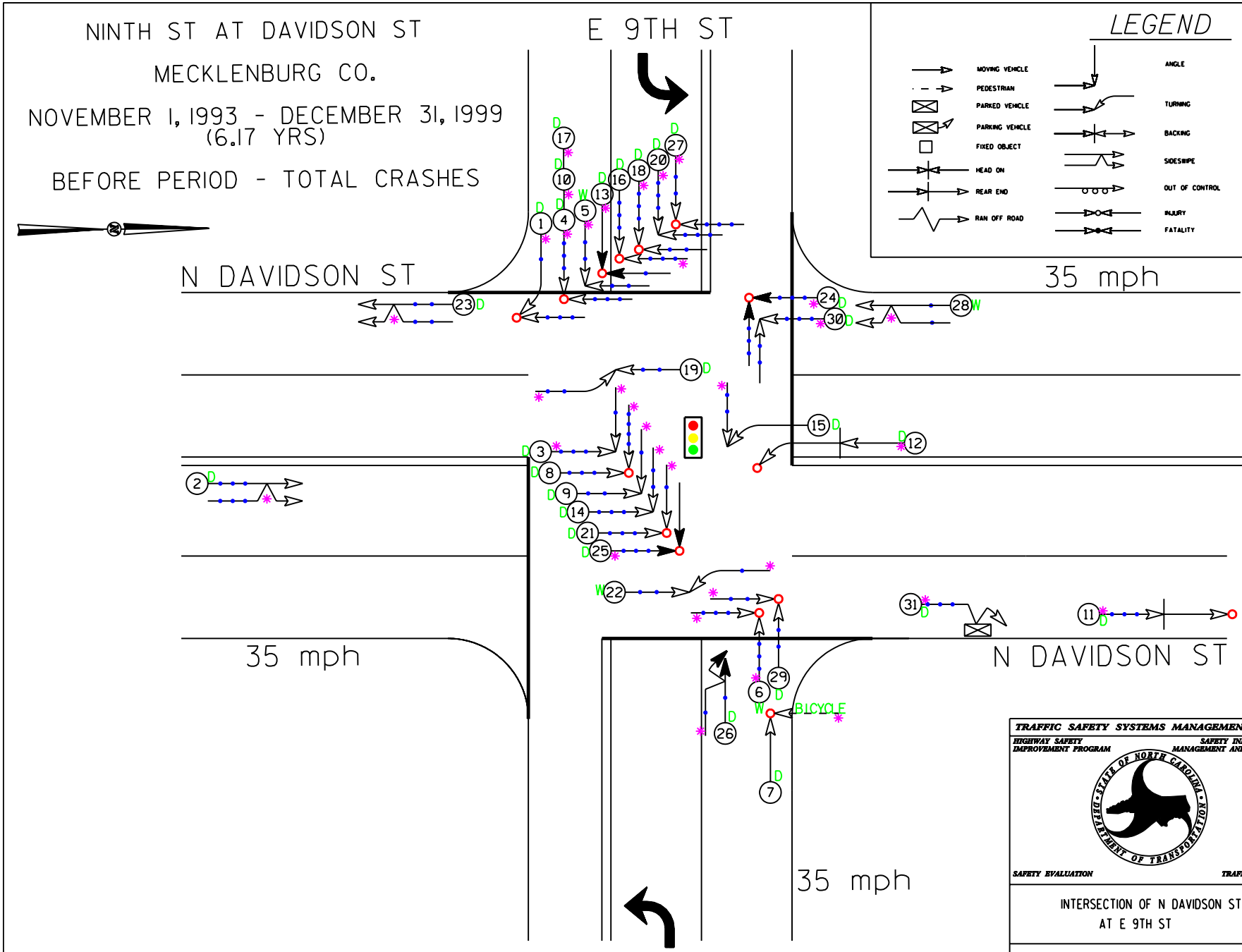
Ninth at Davidson

NINTH ST AT DAVIDSON ST

MECKLENBURG CO.

NOVEMBER 1, 1993 - DECEMBER 31, 1999
(6.17 YRS)

BEFORE PERIOD - TOTAL CRASHES



LEGEND

- MOVING VEHICLE
- PEDESTRIAN
- PARKED VEHICLE
- PARKING VEHICLE
- FIXED OBJECT
- HEAD ON
- REAR END
- RAN OFF ROAD
- ANGLE
- TURNING
- BACKING
- SIDESWIPE
- OUT OF CONTROL
- INJURY
- FATALITY
- 9 MPH OR LESS
- 10 MPH TO 19
- 20 MPH TO 29
- 30 MPH TO 39
- 40 MPH TO 49
- 50 MPH TO 59
- 60 MPH TO 69
- 70 AND UP
- SPEED UNKNOWN
- DAYLIGHT CRASH
- DARK CRASH
- P PEDESTRIAN
- B BICYCLE
- T TRAIN
- A ANIMAL
- VEHICLE FIRE
- DRIVER AT FAULT
- D DRY
- W WET
- I ICY OR SNOWY

TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF N DAVIDSON ST
AT E 9TH ST

COLLISION DIAGRAM

DIVISION: 10	REGION: METRO
STUDY PERIOD: 11/01/93 - 12/31/1999	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	09/05/2007
LOG NUMBER:	200706083
PAGE:	1OF 1

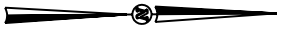
N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH

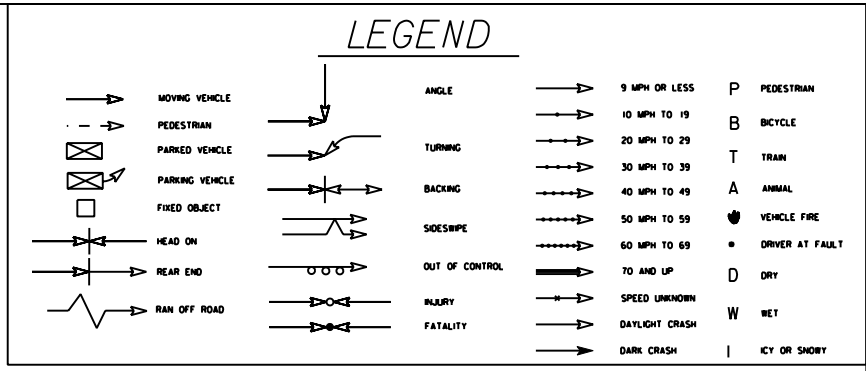
NINTH ST AT DAVIDSON ST

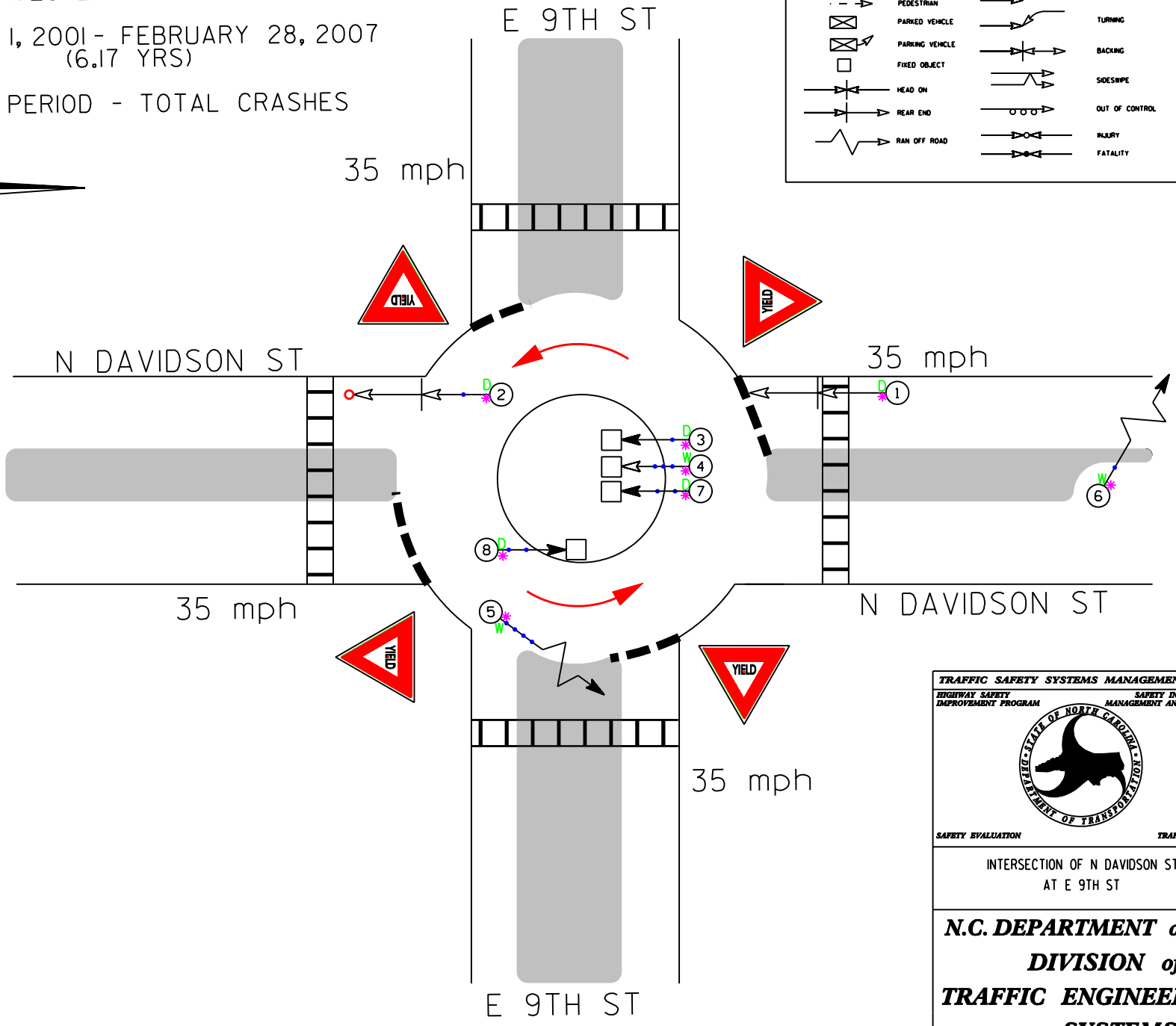
MECKLENBURG CO.

JANUARY 1, 2001 - FEBRUARY 28, 2007
(6.17 YRS)

AFTER PERIOD - TOTAL CRASHES







TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT

HIGHWAY SAFETY IMPROVEMENT PROGRAM

SAFETY INFORMATION MANAGEMENT AND SUPPORT

SAFETY EVALUATION

TRAFFIC SAFETY

INTERSECTION OF N DAVIDSON ST
AT E 9TH ST

COLLISION DIAGRAM

DIVISION: 10	REGION: METRO
STUDY PERIOD: 01/01/01 - 02/28/07	
ANALYSIS PREPARED BY: CLS	
DIAGRAM PREPARED BY: TSF	
DIAGRAM REVIEWED BY: CLS	
SCALE:	NOT TO SCALE
DATE:	9/5/2008
LOG NUMBER:	200706083
PAGE:	1 OF 1

N.C. DEPARTMENT of TRANSPORTATION
DIVISION of HIGHWAYS
TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH